Engineering and the corporate photographic archive:

a study of the albums of S. Pearson & Son, 1880–1930

Noeme Santana

Department of Geography

Royal Holloway, University of London

Submitted for the degree of PhD

Declaration of Authorship

I, Noeme Santana, hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Signed: _____

Date: _____

Abstract

This thesis considers the uses of photography by, and the photographic archive of, the British civil engineering conglomerate S. Pearson & Son, between 1880 and 1930. Photography, widely perceived at the time as being accurate and objective, allowed engineers to record and to disseminate, to a variety of audiences, representations of infrastructure as it was built. The firm's photographic archive offers a uniquely rich record of these applications of photography and allows for an examination of the production, dissemination, and consumption of photographic albums, in both professional and commercial contexts within the engineering industry. Drawing on scholarship in historical geography, history of technology, and the history of photography concerned with the materiality of photographs, the thesis considers the company's use of photographic albums to manage long distance communications, and to project expertise and excellence.

Chapter 1 outlines the themes in the thesis and focuses on the historiography of the company and the social biography of its photographic archive. Chapter 2 discusses the conceptual frameworks underlying the study of photographs and albums produced in industrial contexts, and the methodologies employed to survey the collection. Chapter 3 outlines the broader relationships between photography and civil engineering, and considers the various uses of photography by industrial corporations such as Pearson. Chapter 4 develops an original typology of the firm's photographic albums. Chapter 5 considers the use of albums as working documents and tools of business communication. Chapter 6 examines the use of photography to promote the firm's corporate image externally. Chapter 7 concludes the thesis by summarising its main themes, considering the changing role of the Pearson photographic archive and the

implications of digital technologies for future uses. Through its focus on the production, circulation and consumption of engineering photographs within various networks, this thesis suggests new ways of understanding photographs of industry and infrastructure.

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Chapter 1: Approaching the corporate photographic archive

The focus of this thesis is on a little-known and little-studied photographic archive compiled by the British civil engineering and oil conglomerate, S. Pearson & Son, held within the collections of the Science Museum, London.[1] The research presented here was supported by an Arts and Humanities Research Council-funded Collaborative Doctoral Award, in a partnership between Royal Holloway, University of London and the Science Museum. As with many similar collaborative research projects in the UK in recent years, the focus was on a substantial collection of material that had hitherto eluded significant scholarly attention yet presented a major opportunity not merely to understand the collection itself, but also to reflect on its wider significance—in this case, for scholarship on the history of photography and engineering. Throughout the study—which was also facilitated by a placement at The Huntington Library in San Marino, California—I was interested in exposing the intellectual and technological themes that connect the history of industrial photography, engineering practices, corporate archives, and photographic albums.

1.1 Themes of the thesis

Substantial bodies of research literature already exist on the histories of industrial photography, engineering, and the global corporation. However, it would be fair to say that the connections between them—and the study of engineering photography in particular—have not been explored to any great extent. Furthermore, the kind of photography examined here has seldom been represented in museum galleries and exhibitions in the UK, even in those exhibitions devoted to science and technology. While the Science Museum's permanent engineering display briefly discusses the

[1] From this point, and when discussing the company's photographic archive, I refer to S. Pearson & Son simply as Pearson. Whenever I refer to Pearson as Pearson PLC, I am referring to the current name of the company.

connection between engineering and visual technologies, the subject of engineering photography specifically is barely present. Such a subject, where it is treated at all, tends to be presented in public and commercial art galleries. For example, the Victoria and Albert Museum's 2016 engineering season—"Engineering the World"—displayed a series of photographs from the work of Arup, a British infrastructure corporation.[2] In 2014, two London exhibitions, one a retrospective of the work of German photographers Bernd and Hilla Becher, and the other, a series of photographs of factories taken by the American film director, David Lynch, were held.[3]

These exhibitions built on a longer-standing concern with technology and industrial photography in the visual arts, evident, for example, in the Arts Council-funded touring exhibition, "Industrial Image", during the late 1980s.[4] The exhibition comprised more than three-hundred photographs covering engineering practice and technologies from the 1850s to the present. The photographs were organised primarily by theme—ranging from "modern wonders", a display of mid-nineteenth-century photographs from, among others, Philip Delamotte, Henry Fox Talbot, Roger Fenton, and Robert Howlett, to "engineers and industrialists", "metropolitan improvements", and "the post-war years".[5]

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[2] The exhibition, "Engineering the World: Ove Arup and the Philosophy of Total Design" was on display for six months from June to November 2016. The first major retrospective on the British engineer, Ove Arup, the exhibition showed visitors a wide range of archival materials including: models, blueprints, photographs and drawings of some of the company's well-known contracts such as the Sydney Opera House, Pompidou Centre in Paris, and the Lloyds Building in London. See: "Engineering the World: Ove Arup and the Philosophy of Total Design" last modified June, 2016, https://www.vam.ac.uk/exhibitions/engineering-the-world

[3] "Bernd & Hilla Becher" was held at the Sprüth Magers gallery between September and October 2014. "Bernd & Hilla Becher," Sprüth Magers, last modified September, 2014, http://www.spruethmagers.com/exhibitions/369@@press_en and "David Lynch: The Factory Photographs" was held at The Photographers' Gallery between January and March 2014. "David Lynch: The Factory Photographs," The Photographers' Gallery, last modified January 2014, https://thephotographersgallery.org.uk/whats-on/exhibitions/david-lynch-the-factory-photographs

[4] Between 1987 and 1988, the exhibition toured seven locations of industrial significance in the UK: Nottingham Castle Museum, Bradford Industrial Museum, Billingham Art Gallery, Bristol Watershed, Walsall Museum and Art Gallery, Swansea Maritime and Industrial Museum, and the Science Museum, London. Sue Davies and Caroline Collier eds., *Industrial Image: British Industrial Photography 1843–1986* (London: Photographers' Gallery, 1986), 4.

[5] Davies and Collier, *Industrial Image*, 66–79.

Of direct relevance to this thesis, however, was the exhibition's section on the First World War, where ten photographs from the Pearson collection, Album P79, "Gretna VI" were exhibited. Taken during the construction of His Majesty's Factory, Gretna—a cordite factory built in 1915—the photographs depicted factory interiors, munitions, and workers. These were exhibited alongside photographs of a shell-filling factory in Nottingham (taken by the documentary photographer Horace Nicholls), King George V's visit to an aircraft factory, and images of aeroplane propeller production in Birmingham.[6] The importance of this exhibition lies not only in the themes covered, and its chronological scope, but also in the varied nature of the photographs exhibited. The exhibition's curators, Sue Davis and Caroline Collier, drew upon collections from a wide range of public and private lenders from the UK and abroad.[7] In viewing industrial photography in the round, and seeing in it both evidentiary value and aesthetic interest, the curators of the exhibition set out an approach to the visual culture of engineering that I have sought to replicate here.

In addressing the history of industrial photography and engineering practice through the Pearson photographic archive, the thesis adopts and offers a distinctive perspective. Industrial photography has received relatively little attention from historians of photography; indeed, some of the most significant works exploring this genre have been authored by historians of technology, such as David Nye, Elspeth Brown, and Eric Nystrom.[8] In this thesis, the term 'industrial photography' refers to photographic

[6] Davis and Collier, *Industrial Image*, 71. On Horace Nicholls (1847–1941), see Robin Lenman (ed.), *The Oxford Companion to the Photography* (Oxford: Oxford University Press, 2005), 444.
[7] Fifty-one private and public lenders are listed in the exhibition catalogue, including the British Petroleum Company Library, the Daily Herald Archive, Science and Media Museum, the Institution of Civil Engineers Library, George Eastman Museum, the Royal Photographic Society, Science Museum Library, BTR Industries PLC, Roger Taylor, and Dover Strand Ltd. Davis and Collier, *Industrial Image*, 79.
[8] See, for example, David Nye, *Image Worlds: Corporate Identities at General Electric, 1890–1930* (Cambridge, MA: MIT Press, 1985); Elspeth Brown, *The Corporate Eye: Photography and the Rationalization of American Commercial Culture, 1884–1929* (Baltimore: Johns Hopkins University

representations of products, staff, equipment, and of interior and exterior scenes in manufacturing, engineering, architecture, or business contexts, whether taken by commercial photographers or by others, such as engineers themselves. The nature and range of the body of work which can be considered under this definition is considerably more diverse than is typically defined in generic terms by historians of art photography. Art historical studies of industrial photography have thus focused primarily on the oeuvres of leading figures, highlighting the work of canonical American photographers such as Lewis Hine and Paul Strand, and, in Britain, celebrated exponents such as Robert Howlett and Philip Delamotte.[9]

This thesis extends the conventional academic approach to industrial photography in two ways: first, by foregrounding a concern with engineering practices in the nineteenth century; second, in sustaining a focus on the corporate archive, including the body of archival photography in album form that provides the core empirical material for the thesis. As Chapter 3 demonstrates, I am particularly interested, here, in the professional relationship between photographers and engineers, and how engineers embraced photography in their professional practice. As the Pearson archive shows, photography—alongside maps, blueprints, diagrams, and technical drawings—came to be a routine tool by which complex phenomena and technical knowledge were represented visually. In the context of this study, 'corporate archives' are taken to be the collection of written and visual records of a business, including its administrative files, external correspondence, memoranda, meeting minutes, contracts, photographs, films,

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Press, 2005); Eric C. Nystrom, *Seeing Underground: Maps, Models and Mining Engineering in America* (Reno: University of Nevada Press, 2014).

[9] See, for example, Karl Steinorth (ed.), *Lewis Hine: Passionate Journey: Photographs, 1905–1937* (Zurich: Edition Stemmle, 1996); Naomi Rosenblum and Alan Trachtenberg, *America & Lewis Hine: Photographs, 1904–1940* (New York: Aperture, 1977); International Museum of Photography at George Eastman House, *The Crystal Palace: Photographs by Philip H. Delamotte* (Rochester: George Eastman House, 1980).

and corporate gifts.[10] The Pearson archive—incorporating maps, blueprints, and personal items associated with Lord Cowdray, the company's director from 1880 to 1930—includes examples of all these items.[11] The inclusion of Cowdray's diaries and personal correspondence has given researchers valuable insights to his personal, political, and entrepreneurial motivations, as is reflected in various published accounts of the company's history that focus heavily on the director's personal narrative.[12] While such materials may be of value in a study such as this, my focus on the uses of photography within the company has allowed me to highlight other, often-neglected aspects of the operation of the business as an international concern, not least its routine commercial practices and the ways it dealt with the problem of information exchange across geographical distances. Chapters 5 and 6 look, in this respect, at how photographic albums were used to communicate within and between the firm's various professional networks (whether Pearson staff, clients, or professional bodies).

Photographic albums are the core of the Pearson collection; they are, likewise, at the centre of this thesis. The majority of the collection's photographic items—around 13,000 photographs bound into 138 photographic albums—were compiled by Pearson staff in the company's drawing department. A small number of albums in the collection

[10] In the context of this thesis, I will frequently refer to, and exchange between, 'archive' and 'collection'. The Pearson archive is, here, understood as the collection of the company's business records from 1880 to 1970. The Pearson collection describes the collection under the care of the Science Museum. In understanding the depth and breadth of archives, see, for example, Joan M. Schwartz and Terry Cook, "Archives, Records, and Power: The Making of Modern Memory," *Archival Science* 2 (2002): 1–19; Allan Sekula, "Reading an Archive: Photography Between Labour and Capital," in *The Photography Reader*, ed. Liz Wells (London: Routledge, 2003), 443–52.

[11] Lord Cowdray is, here, Weetman Pearson, director of S. Pearson & Son between 1879 and his death in 1927. In addition to his entrepreneurial career as head of Pearson, Weetman's political career spanned the period between 1895, when he was elected as a Member of Parliament for Colchester, and 1917 when he was granted a peerage, and assumed the titled Lord Cowdray. In what follows, I refer to the firm's director as Weetman Pearson or Lord Cowdray depending on the time period under discussion.

[12] John A. Spender, *Weetman Pearson, First Viscount Cowdray, 1852–1927* (London: Cassell & Co, 1930); Robert K. Middlemas, *The Master Builders. Thomas Brassey, Sir John Aird, Lord Cowdray, Sir John Norton-Griffiths* (London: Hutchinson, 1963); Desmond Young, *Member for Mexico: A Biography of Weetman Pearson, First Viscount Cowdray*, (London: Cassell & Co, 1966); Paul Garner, *British Lions and Mexican Eagles: Business, Politics, and Empire in the Career of Weetman Pearson in Mexico, 1899–1919* (Stanford: Stanford University Press, 2011).

were, however, assembled and produced externally, exhibiting material qualities and functions that contrast with the albums produced in-house. In Chapter 2, I introduce the theoretical context for album research, by examining scholarship—such as that by Patrizia Di Bello, Martha Langford, Louise Purbrick, and Elizabeth Siegel—that has addressed albums and memory.[13] While this body of scholarship offers insights relevant to the Pearson photographic collection—in particular, the relationship between albums, memory, and imaginaries of the future—the distinctive way the Pearson corporate albums were produced, circulated, and consumed requires a different kind of intellectual engagement. Compiled with the primary purpose of organising and safely storing visual business records, these records speak more of the corporate spaces and networks in and through which images of industry and infrastructure were produced, circulated, and consumed than of the intimacy of the domestic space in which family albums were made and viewed. In this context, as I argue in Chapter 2 (and illustrate in Chapter 4), understanding the purposes and functions of the Pearson albums requires a methodology that foregrounds, and takes seriously, the evidentiary value of their material qualities.

1.2 Pearson: the history and legacy of a global corporation

In 1844, Samuel Pearson founded a brickmaking and contracting company in Bradford, Yorkshire—the eponymous S. Pearson & Son. Pearson's history as a celebrated contracting enterprise, following a trajectory from small-scale family business to multi-industry global conglomerate, runs parallel to other histories of successful family-

[13] See, for example, Patrizia Di Bello, *Women's Albums and Photography in Victorian England: Ladies, Mothers, and Flirts* (Aldershot: Ashgate, 2007); Martha Langford, *Suspended Conversations: The Afterlife of Memory in Photographic Albums* (Montreal: McGill-Queens University Press, 2001); Louise Purbrick, "Nitrate Ruins: the Photography of Mining in the Atacama Desert, Chile," *Journal of Latin American Cultural Studies* 26, no. 2 (2017): 253-278; Elizabeth Siegel, *Galleries of Friendship and Fame: A History of Nineteenth-Century American Photograph Albums* (New Haven, CT: Yale University Press, 2010).

founded Victorian businesses. Much has been written about Pearson, its history, and the various high-profile engineering contracts for which the company was responsible. In London, Pearson's legacy is still central to the fabric of the city—it is evident in, for example, the Blackwall Tunnel, spanning the Thames in East London; the Charlton Storm Relief Sewer; and the Great Northern and City Railway, connecting the City of London with Finsbury Park. More widely in the UK, the legacy of the company's work is evident, for example, in the Admiralty Harbour in Dover; His Majesty's Factory, Gretna; Port Talbot railway and docks, in Wales; and the Silent Valley Reservoir, in Northern Ireland. Overseas, the scale and spread of Pearson's work is similarly significant; its engineering contracts included infrastructure built in the United States (Hudson River tunnel, New York), Mexico (Gran Canal, Mexico City), Canada (Dry docks, Halifax), Malta (various breakwaters in the island), Sudan (Sennar Dam), and China (Beijing Syndicate railway).

Given the temporal focus of this thesis, it is important, here, to contextualise Pearson's history in the late-nineteenth and early-twentieth centuries during which time the company was under the leadership of Weetman Pearson, grandson of the founder, Samuel Pearson. In 1879, thirty years after the company was founded, Samuel Pearson retired, giving his grandson his share of the company. Weetman, then 19, became part-owner of the company alongside his father, George Pearson, until 1894 when he became sole partner. In what follows, I am particularly concerned with the period of Weetman Pearson's directorship between 1879 and his death in 1927, an event that was followed in 1930 by the closure of Pearson's engineering subsidiary company—a move intended to allow the firm to focus on new ventures. These key events correspond roughly with the timespan of this thesis.

The company's historians agree that, during the period in which Weetman was director, Pearson grew exponentially both in size (with the addition of subsidiaries) and in the complexity of the types of contracts it pursued.[14] In 1884, five years into Weetman's directorship, the company's headquarters moved from Bradford to London, an event that was crucial to the company's involvement in a wider range of domestic contracts, and, perhaps more importantly, in opening the firm up to the possibility to bid for international contracts. In addition to its thriving engineering department, the twentieth century saw Pearson expand the scope of its business into different fields, including oil exploration in Latin America (with a strong focus on Mexico), water and electricity supply, banking subsidiaries, and media ownership.[15] The closure of the engineering subsidiary in 1930 signalled a major shift in direction for the company and coincided with the 'end' of the engineering photographic archive as a key business tool.

Pearson's rich history as a global engineering and oil conglomerate, allied with Weetman Pearson's fascinating biography, has attracted attention from historians who have approached the company's history from various perspectives, including biography, business history, and politics. The earliest histories of the firm focused heavily on the biography of Weetman Pearson himself, providing little or no discussion of the wider social, political, or economic contexts of the company's operations as a global conglomerate.[16] A second strand of work on Pearson's history has come from business historians whose interest in the company has focused primarily on its South American

[14] See, for example, Garner, "Weetman Pearson in Historical and Historiographical Context: Britsh-Mexican Relations, Informal Empire, Mexican National Development, and the Rise of Global Business in the Late Nineteenth Century," in *British Lions* , 6–30; Jonathan C. Brown and Alan Knight, eds. *The Mexican Petroleum Industry in the Twentieth Century* (Austin: University of Texas Press, 1992); Lisa Bud-Frierman, Andrew Godley, and Judith Wale, "Weetman Pearson in Mexico and the Emergence of a British Oil Major, 1901–1919," *The Business History Review* 84, no. 2 (2010): 275–300.
[15] A rough timeline of the company's business focus is 1) civil engineering, 1844–1930; 2) oil, water supply, electric, and banking subsidiaries, 1890–1930s; and 3) media ownership, late 1920s–today.
[16] John Spender and Robert Middlemas's work—see note 12—places a strong emphasis on Weetman Pearson's biography and highlights some of the company's most high-profile contracts.

ventures, particularly oil exploration in Mexico in the early twentieth century. Paul Garner's work on Weetman Pearson's political career and his close relationship with Mexico's president Porfirio Díaz, is, perhaps, the most nuanced approach to the company history, including, as it does, extensive discussion of political and economic aspects of the company's success in Mexico, focusing not merely on the oil branch of the company but also on its civil engineering contracts.[17]

The focus of this thesis is on the interpretation and the significance of the photographic archive accrued by the company in the period 1880 to 1930. While the wider historical context has been examined in detailed studies of the biography of Pearson himself, and of the company's corporate operations in Mexico, the US, and UK, its substantial photographic archive has been entirely neglected, except for purposes of illustration. John Spender, Desmond Young, and Keith Middlemas's biographical approach to Pearson is, nonetheless, useful in the contextual insight it offers into the company's wider history. Spender, Weetman Pearson's secretary, wrote Pearson's biography shortly after the director's death. Charged with an inevitable degree of personal investment in this narrative, the biography explores the dynamics of Weetman's family history, his personal and political motivations, and describes the company's triumphant ascension to a global scale as inevitable under Weetman's leadership. Building upon Spender's account of the company's history, Middlemas's *The Master Builders* (1963), places Pearson within an elite circle of Victorian contractors that also included Thomas Brassey (Grand Trunk Railway, Canada), Sir John Aird (dismantling and transportation of the Crystal Palace), and Sir John Norton-Griffiths (several engineering projects in South Africa). In a similar vein to Spender, Middlemas seeks to place Weetman Pearson

[17] Garner's monograph, and Bud-Frierman, Godley, and Wale's paper (cited in note 14) are useful to contextualise the corporation and its wider oil-related business strategies.

in the firmament of great Victorian engineering, focusing largely on the major infrastructure contracts for which Pearson is known, including the Hudson River tunnel, and the Gran Canal in Mexico. Young's account of Pearson, and Lord Cowdray follows a similar path as the previous authors; by focussing on a linear narrative, which includes company's ascension to a global scale, in conjunction with Cowdray's political career, Young's book is an updated take on Spender's monograph.

Historical scholarship on Mexican Eagle, the company's oil exploration subsidiary, has helped frame the political and financial contexts of Pearson's expansion into oil exploration, refining, and exporting, clarifying the actual corporate processes and functions of the company. Paul Garner's work, in particular, has been helpful in documenting the political and financial networks through which the company secured various high-profile engineering contracts in Mexico and further concessions in exporting oil-based products. A common feature of the historical literature on Pearson is the reproduction of material from the photographic collection to illustrate wider points made about the company. Typically, these images are used to provide readers with a visual representation of what is being discussed in the text, which is evidently useful when describing complex infrastructure contracts, including the finished products.

However, this kind of engagement with the photographic archive—primarily as a source of illustration for otherwise textual accounts—limits what can be said about the role of the photographic materials as a working archive. Simply treating the photographic parts of the collection as a source of illustration does a disservice to the company history itself. Photographic record keeping was a crucial element of the company's internal communication methods, and can also tell us something important about the company's corporate image. While previous scholarship on the firm's history has not been

concerned with these issues, this thesis focuses specifically on the role of the photographic archive and its functions within the spaces and channels of corporate communication.

1.3 The Pearson collection: overview of a working archive

In introducing the Pearson collection, it is necessary first of all to give a sense of its scale and the types of records and other materials in the collection, as well as how these were used by Pearson staff, and how the collection was stored and accessed during the period under study. Comprising 12,812 photographs housed in 138 photographic albums, 80 boxes of written records, corporate gifts, Lord Cowdray's personal diaries, blueprints, maps, and loose photographic prints, the Pearson collection in its present form occupies ten archival shelving units. Figure 1.1, taken at the Science Museum Library and Archives, Wroughton, displays the physical scale of the collection, and the strategies employed by Pearson to classify and organise the company's records. The wide range of materials in the collection indicates a dynamic business archive where materials of corporate and personal significance were deposited and accrued over the fifty-year period with which this thesis is concerned.[18] The collection can be divided, broadly, into three kinds of artefacts: written records, visual records, and corporate gifts. The written records comprise business contracts, accounting books, Lord Cowdray's personal diaries, official external correspondence, internal memos, patents, reports, and newspaper clippings. The visual records include albums, loose photographic prints, maps, diagrams, blueprints, illustrated reports, commemorative booklets, and one film

[18] It is worth noting here, that the current iteration of the Pearson collection is the result of several decades of changes, whereby, some photographic albums were used and never returned to the archive. Other albums were removed before the archive was transferred to the Science Museum in 1972. This will be discussed in more depth in Chapters 4 and 5.

reel depicting an opening ceremony in Mexico. Corporate gifts range from commemorative paperweights to souvenirs in the form of opening ceremony invitations and event menus.

Throughout its existence, a multitude of Pearson staff engaged with the contents of the collection in different ways, and understanding these various engagements forms an important part of my process of interpretation. For example, the cross-departmental and collaborative process of in-house album production, examined in Chapters 4 and 5, suggests something of a contrast with the way Victorian personal photographic albums were compiled (either by a single individual or collectively by close family members). In the context of the industrial, corporate album, the process of in-house production was highly routinised and collaborative. Such albums were created and used by members of staff in the drawing department, secretarial staff, senior management, and engineers. Album compilation can be imagined thus: first, photographs were sent by Pearson engineers working onsite (whether in the UK or overseas) to the company's head office in central London; second, secretarial staff in London stamped and processed incoming post (which included loose photographic prints); third, the materials were then sent to the drawing department to be included in albums. It is reasonable to assume, given the form and contents of these albums, that staff in the drawing department were advised by senior management or by engineers on the sequencing of their contents. A clear and consistent visual format—that included standardised indexes, captions, titles, and image positioning—indicates rigour in the method of compilation.

Other types of interactions with the collection that are directly or indirectly evidenced in the Pearson archives include managers' analyses of visual and written evidence sent by engineers contracted to report on the feasibility of prospective infrastructure; detailed

correspondence from engineering staff in the field to update the London office on the status of infrastructure construction; and, in a more routine mode, interactions characteristic of the day-to-day running of a large international corporation, such as updating accounts books, consulting contracts, and producing and archiving memos. It is important, here, to reiterate the active nature of this corporate archive: as well as being a collective repository for materials from the company's history, this was a working archive, a tool of management and corporate presentation.

After 1930, with the diversification of the business and the move away from civil engineering, the Pearson collection, as it is presently manifested at the Science Museum, appears to have shifted from an active archive to a more passive one, at least in terms of its growth, which was curtailed. There is relatively little direct archival evidence that sheds light on its uses, internal or external, during the period prior to its transfer to the Science Museum. It is possible, however, to gain some idea of how the collection was stored and accessed through Business Archives Council correspondence, and the collection's accession file at the Science Museum Library in Wroughton, which includes correspondence with Pearson PLC immediately prior to its transfer to South Kensington.[19] One of the key points raised by the museum's Keeper of Engineering at

[19] The Business Archives Council, founded in 1934 is a charitable body dedicated to the promotion and conservation of business records, and for providing advice on historical business archival management. In the context of this thesis, it is important to spend some time to contextualise the role the council played in liaising with several institutions approached to house the Pearson archive. The council was initially contacted by Pearson in 1969 when the company secretary requested advice on the donation of a large-scale set of 264 stained-glass commemorative window panels which vertically spanned six floors, adorning the exterior of the firm's head office. Initial interest from the University of Hull, the University of Manchester, and the Victoria and Albert Museum proved unfruitful, as the sheer physical scale of the window panels was a discouragement. Further conversations between Pearson and the council, resulted in the company offering the commemorative window panels and the company's archive as an incentive to entice a Yorkshire-based repository. However, this strategy came to be a further deterrent, as the both the University of Bradford, and Leeds City Libraries were not in a position to accept a donation of that scale. Leeds Polytechnic (Leeds Beckett University), accepted the window panels. Ultimately, accessibility, location, and storage were weighing factors, and, based on these, the council contacted the Science Museum to understand if the museum would be interested in accepting the company's archive. On 31 December 1971, two years after Pearson first contacted the council, David Follett, director of the museum, having consulted with the Library and Civil Engineering Keepers replied to the council's letter

this time was that a few albums were missing from the original finding aid provided by Pearson. The company's Secretary indicated that the missing albums were likely due to their having been borrowed by members of staff. Some references to external researchers accessing the collection during this period are also made in correspondence to the museum. A few of the boxes in the collection have ink markings on the outside which read 'vault', suggesting that at least the business records were stored securely in the company's vault. There is no indication of where the remainder of the collection, including the photographic albums, were stored.[20]

While documentary evidence of the actual uses of the archive is selective and fragmentary, layers of material qualities suggests that this was an archive in constant use. Stamps on the back of photographs noting the date these were processed, pencil markings, notes, worn albums pages, and more recently, the re-binding of a large proportion of the photographic albums indicates that throughout its existence as a corporate archive, and now at the museum, this collection was constantly engaged with, especially during its active stage as a recipient of various corporate records. My interest in the materiality of the photographic archive has an important methodological dimension. Close attention to questions of form and format has the potential to unearth histories of photographic creation, circulation, and consumption, particularly in the context of corporate collections such as the one examined in this thesis. In attending, in what follows, to one corporate photographic archive, I endeavour not only to signal the empirical value of such archives for what they reveal about the linked practices of engineering and photography, but also to suggest specific methodological approaches by which we might understand albums as tools of communication and devices for the

expressing an interest in housing the archive, a long-term loan, which was announced in 1972 with several press releases. See: Business Archives Council Archives, General Correspondence (Box 12).
[20] S. Pearson & Son accession file, Sc.L.G 171/821, Science Museum Library and Archives.

circulation of knowledge, the projection of prestige, and the development of a corporate culture.

1.4 Researching the Pearson collection

Housed at its current location in Wroughton, Wiltshire, since 2007, the collection has been available for consultation at the museum's Library in central London since 1972. Information about the collection is readily accessible through the museum's library and archives web portal, and researchers can request an appointment to access the collection in Wroughton. My own access in the context of this project was, however, greatly facilitated by the collaborative nature of the PhD. The Pearson business records were consulted on site at Wroughton; the 138 photographic albums were transferred in batches to the Museum premises in South Kensington.

Once an infrastructure was set in place to access the various parts of the collection, I devoted a full six months to documenting the photographic albums and three months to transcribing selected business records. My previous experience in research for a postgraduate dissertation at the Photographic Research Centre at De Montfort University was helpful in the process of planning and undertaking a substantial exercise in documentation. Archival staff at Wroughton also provided advice on particular aspects of the collection especially relating to conservation and management. For example, John Underwood, the librarian at Wroughton, was able to clarify aspects of the conservation process which had been used to re-bind a majority of the albums in the collection. John's memory of his own involvement in the re-binding process also shed light on associated questions, such as why green and burgundy were chosen as colours for the newly re-bound album covers—these colours, it turned out, were the lead

archivist's favourite colours! Access to associated archival documents such as the collection's acquisition file was tremendously helpful as a means to contextualise the process by which the collection was originally acquired by the museum. The acquisition file, read in conjunction with the Business Archives Council correspondence, was particularly useful as evidence for an understanding of the process of the collection's transfer from Pearson PLC to the museum.

Initially, the documentation of the album collection was organised through a set of questions designed to generate a spreadsheet of data: information on album size, page size, number of pages, image size, type of photographic process, condition of the album (good/ poor), numbering of the album pages, markings or notes (in ink, pen or by company stamps), visual narrative or ordering (chronological or thematic), subject, type of contract (private investment or government), name(s) of photographer(s) if available, dates covered, and potential value for further study as a case study in the thesis. A survey of this nature evidently required a standardised approach to the collection, processing, and storing of the resulting data. Every photograph in each album was surveyed, generating a table of data for each album. Due to restrictions in handling the albums, and space constraints in the lending and acquisitions office (where I consulted the albums), I used a notebook, pencil and measuring tape to record the data manually. I also used a digital camera to document each page, a process through which I have inadvertently created a low-res digital archive version of the entire series of albums. A digital version of the data was generated in Excel spreadsheet form (as summarised in Chapter 4).

As the research progressed, I sought to make links between the photographic archive and associated business records, and to situate particular themes and examples in wider

contexts, historically and conceptually. Throughout, however, the documentation of the material form of the photographic albums remained the core material for the thesis and provided the basis for the typology which lies at its heart (as presented in Chapter 4). The core questions asked of these materials concerned functions (why were albums made, and what were their purpose?), processes (how was the collection produced, circulated and consumed, and by whom?) and themes (what themes are presented in the albums, and how are they related to the purposes for which albums were made?).

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In the Introduction to the thesis, I have outlined key themes that I shall explore in subsequent chapters. Challenging the canon of industrial photography by bringing photographic modes of production, circulation, and consumption to the foreground of my analysis, paying close attention to the album form, and understanding how the Pearson archive functioned, are some of the directions I take in this study of the Pearson albums. An understanding of previous scholarship concerned with the company and its history is helpful to frame my research. Equally, an overview of the collection; its objects, and its rich social biography contextualises its arrival and existence at the Science Museum for the last forty-five years. In what follows, I shall outline the theoretical underpinnings which frame the thesis.

Chapter 2: Re-thinking industrial photography: researching the photographic archive

This chapter has two principal aims. Firstly, it seeks to situate research on the Pearson collection within the wider literature on industrial photography and photographic collections in order to clarify the conceptual basis for, and wider significance of the findings presented in the rest of the thesis. Secondly, it presents an argument about the ways in which industrial photography generally, and research on photographic collections more specifically, can be re-positioned and re-thought through a focus on the materiality of the photographic archive. The chapter is organised into three sections, each concerned with a specific historiographical theme. In the first section, I look at how the historical literature has engaged with industrial photography. In particular, I am interested here in the ways in which photographs depicting Victorian engineering projects have featured, and been appraised, in the canon of nineteenth and twentieth-century industrial photography. Here, I argue that there is value in challenging this often biographically focused canon by placing less emphasis on the role of well-known Victorian commercial photographers and engineers. Instead, we should examine the day-to-day practices that linked engineering and photography in the nineteenth and twentieth centuries, also giving space to the less-celebrated practitioners of industrial photography. By taking into consideration the wider contexts in which photographs in industrial contexts were produced, used, and circulated, further insights into industrial photography can be developed, bringing new questions about its functions and meanings to the surface, and allowing for a richer and more nuanced understanding of photographic archives created in corporate contexts such as those of the Pearson company.

In the second section of the chapter, I consider the material form of the photographic collection and associated practical issues, in particular the acts of collecting and organising photographs, and the means by which access to photographic collections,

whether publically or privately held, is managed and regulated. In this context, it is also important to consider the specific geographies of photographic collections and how the physical location of a collection can play an important role in *who* can access it and *how* it can be used. Questions of location and accessibility were, for example, subject to careful consideration by Pearson PLC at the point at which the firm was deciding where, and to whom, the company's archive should be donated. In examining the correspondence between Pearson, the Business Archives Council, and the Science Museum from the late 1960s, I reveal the level of concern about how the archive could and should be engaged with by future academic and non-academic audiences. In detailing the negotiations that led up to the donation of the collection to the Science Museum, I consider the twin concerns of legacy and location. Inter-institutional conversations of this type reveal the complexities of corporate archive acquisition, an often unknown or neglected aspect of the social biographies of such collections, and expose otherwise obscured concerns linking archives and place. In different ways at different times, location has mattered to the use, and usability, of the Pearson collection.

The Pearson photographs are part of a diverse material collection that spans a fifty-year period of active production and corporate use. As such they are intertwined with wider material histories reflecting the collection's various historical corporate functions and its recent public and academic uses. In the absence of precise and detailed evidence explaining the rationale underpinning the production and active use of the archive by the firm, my approach to researching and interrogating it was guided by the principle that photographs are material objects with complex, multi-layered physical qualities and individual, sometimes unique, social biographies. This approach to the materiality of photographs, most closely associated with the work of Elizabeth Edwards and Janice

Hart, engages with photographs as three-dimensional objects with tangible material qualities.[1]

The theme of materiality is explored in the third section of this chapter, which is concerned with the material qualities of photographic albums, and suggests that an emphasis on aspects of material form reveal rich social biographies that have been omitted or ignored hitherto.[2] Here I examine the use of materiality as a concept, and a methodology with which to engage the collection's albums, specifically, as multi-layered photographic objects with particular material qualities inherent to their production, circulation, and consumption. This provides a basis for the examination of the photographic archive, revealing the otherwise undocumented production, use, and circulation of the photographic albums within various national and international networks of engineering professionals and academic researchers.

The ongoing production of photographic albums over a sustained period indicates a clear corporate strategy for the production and storage of, and access to photographic materials within the company. These albums formed an integral part of a functioning, and functional, corporate archive. While the structural organisation of the Pearson albums reflects specific corporate strategies of record-keeping and access, the albums themselves are part of a much wider tradition of album production in a variety of institutional and social contexts. In order to contextualise the Pearson albums in relation to wider scholarship on nineteenth-century photographic albums, this section outlines

[1] Elizabeth Edwards and Janice Hart, ed., *Photographs Objects Histories: on the Materiality of Images* (London: Routledge, 2004), 1–15.
[2] For example: Simone Natale, "Photography and Communication Media in the Nineteenth Century," *History of Photography* 36, no. 4 (November 2012): 451–56; John Hannavy, "John Cooke Bourne, Charles Blacker Vignoles and the Dneiper Suspension Bridge at Kyiv," *History of Photography* 28, no. 4 (November 2004): 334–48; International Museum of Photography, *The Crystal Palace*; Davies and Collier, *Industrial Image*.

the various ways in which the albums have, historically, been analysed and conceptualised. I argue here, that the Pearson albums, produced as they were in a specific corporate environment for a particular set of audiences, are a distinct type of album, in terms of how they performed as objects of internal and external communication, and how they functioned as a form of visual currency for the various audiences by which they were consumed. This discussion provides a basis for the subsequent development (in Chapter 4) of a typology of the photographic albums within the Pearson archive.

2.1 The history of industrial photography

The application of photography in the context of industry and engineering in the nineteenth and early-twentieth centuries has yet to receive the same scholarly attention that has been devoted to the role of photography in other emerging nineteenth-century disciplines such as anthropology, geography, and the physical sciences.[3] Recent scholarship within the fields of art history and the history of technology has, however, begun to suggest new approaches to the history of industrial photography in the United States of America and Great Britain. Each disciplinary engagement has brought with it

[3] See, for example, Elizabeth Edwards, *Raw Histories: Photographs, Anthropology and Museums* (Oxford, Berg: 2001); Christopher Pinney, *Photography and Anthropology* (London: Reaktion, 2011); Deborah Poole, *Vision, Race and Modernity: a Visual Economy of the Andean Image World* (Princeton: Princeton University Press, 1997); James R. Ryan *Picturing Empire: Photography and the Visualization of the British Empire* (London: Reaktion, 1997); Luciana Martins, *Photography and Documentary Film in the Making of Modern Brazil* (Manchester: Manchester University Press, 2013); James R. Ryan *Photography and Exploration* (London: Reaktion, 2013); Gregg Mitman and Kelley Wilder, eds., *Documenting the World: Film, Photography, and the Scientific Record* (Chicago: University of Chicago Press, 2017); Joan M. Schwartz and James R. Ryan, eds., *Picturing Place: Photography and the Geographical Imagination* (London: I.B. Tauris, 2003); Joan M. Schwartz, "Felix Man's 'Canada': Imagined Geographies and Pre-texts of looking," in *The Cultural work of Photography in Canada*, eds. Carol Payne and Andrea Kunard (Montreal: McGill-Queen's University Press, 2011); Kelley Wilder, *Photography and Science* (London: Reaktion, 2009).

its own considerations and priorities when engaging with the photographic collections of industry and commerce.[4]

In the British context, industrial photography is often associated with the iconic representation of large-scale works of infrastructure: bridges, factory interiors and other material evidence of heroic human labour. As a consequence, the canon of British industrial photography is typically seen to comprise the oeuvre of nineteenth-century photographers made famous by depicting the work of equally famous Victorian engineers. Epitomising this relationship between photographer and engineer, and this fascination with large-scale infrastructure, is the widely-reproduced photograph of Isambard Kingdom Brunel standing before the launching chains of the SS *Great Eastern.* Figure 2.1, 'Isambard Kingdom Brunel, 1857' was authored by the British photographer, Robert Howlett, and is arguably one of the most, if not the most, celebrated photographic representations of Victorian industry and engineering. Howlett's photograph of Brunel is certainly imposing; the launching chains of the ship in the background dwarf the figure of Brunel himself in the foreground. The engineer is captured smoking a cigar, wearing formal clothing, including a high hat and a pocket watch. Scratches on his shoes, and dirt on the lower half of his trousers provide material evidence of his presence in an active construction site, and perhaps with enough imagination, the viewer can sense the atmosphere of a busy shipyard. The photographer's representational strategy is simple, yet effective; a tightly cropped framing of the subject matter, places Brunel at the centre of the image, while the chains

[4] See, for example: Nye, *Image Worlds*; Nystrom, *Seeing Underground*; Brown, *The Corporate Eye*; Mike Chrimes, *Civil Engineering 1839–1889: A Photographic History* (London: Thomas Telford, 1991); Francis Pugh, "Industrial Image 1843–1918," in *The Industrial Image: British Industrial Photography 1843–1986*, eds. Sue Davies and Carolina Collier (London: The Photographers' Gallery, 1986); Nuno Pinheiro, "Industrial Photography," in *Encyclopaedia of Nineteenth Century Photography,* ed. John Hannavy (London: Routledge, 2007); Jens Jaeger, "Industrial Photography," in *the Oxford Companion to the Photograph*, ed. Robin Lenman (Oxford: Oxford University Press, 2008); Hannavy, "John Cooke Bourne and a Lost Photographic Archive"; Janet E. Buerger, *The Crystal Palace*.

in the background provide a sense of geometry, rhythm, and continuity. Equally, the chains appeal to the viewer's imagination by presenting the engineering feat of building a ship of these dimensions in terms of the sheer scale of the ship and its power. With its presentation of the achievement represented by steamships—icons of British industry and global expansion— through the figure of the heroic engineer, 'Isambard Kingdom Brunel, 1857' is a key example of how industrial photography represented the work of engineering to Victorian audiences.[5]

While much of the canon of British industrial photography consists of the work of well-known commercial photographers, it would be wrong to understand it as purely a commercial undertaking. We can begin to diversify our understanding of the canon of Victorian industrial photography by, for example, considering the engineer *as* photographer. One such engineer-turned-photographer was Evelyn Carey (1858–1932), who was appointed by head engineers Benjamin Baker and Sir John Fowler to document the construction of the Forth Rail Bridge in Scotland (figure 2.2). Using large format cameras and glass plates, Carey's work, likely to be have been commissioned by Fowler and Baker, resulted in the production of nine photographic albums and the publication in 1888 of two photographs credited to Carey in the trade journal *The Engineer*.[6] Captured almost thirty years after Howlett's depiction of Brunel, Carey's photographs—reflecting his position as assistant engineer for the Forth Bridge Railway Company—constitute an impressive body of work, portraying the construction of what was then the longest bridge in the world. Carey's unparalleled position as a trained engineer with technical knowledge of photography and strong compositional skills,

[5] Francis Pugh, "Industrial Image 1843–1918," in *Industrial Image: British Industrial Photography 1843 to 1986*, eds. Sue Davis and Caroline Collier (London: The Photographers' Gallery, 1986), 9–35.
[6] See Pugh, "Industrial Image 1843–1918", 17; Evelyn Carey, "Fife Cantilevers. 24 May 1888," in *The Engineer*, (London: George Reveirs), 96; Pinheiro, "Industrial Photography", 744; Sheila Mackay, *The Forth Bridge—a picture history* (Edinburgh: Moubray House Publishing, 1990).

enabled him to create work that presented audiences with scenes that, on the one hand, clearly depicted the various stages in the construction of the bridge and, on the other, had the capacity to provoke an emotional response of awe and wonder.

The attention devoted by historians of photography to the work of Howlett and Carey—the former, a commercial photographer, and the latter, an engineer-as-photographer—is indicative of a wider and persistent emphasis on the role of the individual in much historical scholarship on industrial photography and engineering. This biography-heavy approach, which emphasises the individual's technical knowledge, compositional skill, and level of formal or informal training, tends to privilege understandings of photography which are heavily focused on particular individuals whose work is highlighted for its exceptional artistic merit. While biographical work in the history of photography is of course important, this type of approach to industrial photography presents two problems in the context of corporate photographic archives. First, applying an individualistic and biographical approach in the context of an archive where the identity of the photographer is rarely known, limits the scope of how much sense can be made of 'authorless' photographs in an archive, and, consequently, may miss the point of the *function* of these types of archives altogether. Second, such an approach with its emphasis on the aesthetic qualities of the image is insufficiently attentive to the specific *nature* of the production of industrial photographs in a corporate environment. For example, a significant proportion of the photographs in the Pearson archive (with the exception of those taken by Pearson engineers seeking to monitor construction progress for internal management purposes) were taken by commercial photographers working under the direct supervision of the resident engineer, employed by the client. This fact suggests that there were several distinct representational interests at play here, complicating any idea of the singularity of the photographer's vision; in this context, it

is the way the photograph is framed and used, especially in the assembled and curated form of albums, that really matters.

In the context of these relationships between commercial photographers, contractors, and clients, research questions led by questions of biography and canonical history—focussing on individual photographers' bodies of work, and their visual and compositional styles—omit altogether the various dynamics of the creation, function, and purpose of corporate industrial archives as a whole. An alternative approach, taking into consideration the "visual economy" of industrial photography in the late-nineteenth century, offers (I suggest), a richer understanding of how these photographs were produced, exchanged, and consumed through national and international networks incorporating a variety of actors including engineers, corporate managers, draftsmen, clients, and politicians.[7] It is worth noting at this point that while the idea of a wider "visual economy" suggests another way of thinking about industrial photography, it is nonetheless important to acknowledge the agency of the individual photographer in the formation of photographic archives such as those of Pearson. The problem with work on industrial photography which is set within a canonical framework is not simply its focus on the individual, it is the framework itself which effectively overlooks a wide cross-section of the social and professional functions of photography as it was applied in the world of engineering during the nineteenth and twentieth centuries.

[7] Here, Deborah Poole's concept of a "visual economy" is useful to think about the production, circulation, and consumption of photographs in the Pearson collection. Poole's theory of economy takes into account the complex systems of photographic creation (technological advances in photographic processes and equipment, and in overseas travel which allowed photographers to travel to remote locations), photographic exchange (photographic formats such as: *cartes de visite*, and photographic albums were relatively affordable to purchase and easy to exchange) and circulation (domestic and public spaces, and the international market for purchase of photographs of distant peoples) into how photographs took on a currency of monetary worth and but also of personal esteem. See, Poole, *Vision, Race and Modernity*, 107–39.

In his study of General Electric's photographic archive, David Nye considers some of the issues facing researchers on comparable collections, namely the challenge of quantifying the type and scope of audiences for the photographs, identifying the purpose(s) to which the archive was put, and tracing the influence of corporate ideologies and structures within the company on its photographic culture.[8] Spanning a time period similar to that of the Pearson photographs, Nye's *Image Worlds* (1985) set the intellectual tone for new approaches to corporate and industrial photographic collections and archives in recent decades. The author's balanced analyses of the General Electric photographic archive, its production, function(s), and audiences, depended substantially on a close working relationship with the company archivist whose direct custodial experience offered an additional layer of interpretation to the book's argument concerning the photographic images. Backed by an impressive visual corporate archive, Nye successfully outlined the crucial role photography played in shaping General Electric's channels of communication to its employees and thousands of clients across the USA. *Image Worlds* presents the reader with a detailed description of the company's investment in photography as a communication tool. For instance, from 1892, a dedicated photographic department and photo studio in the firm's headquarters in New York gave the staff photographer sufficient space to photograph the various products General Electric sold to American consumers.[9] Another example of this is the display and circulation of portraits of members of staff (in magazine format) which Nye argues were also designed to reinforce employee camaraderie and company loyalty.

[8] David Nye, *Image Worlds Corporate Identities at General Electric, 1890–1930*, (Massachusetts, MA: MIT Press, 1985), 9–31.
[9] Nye, *Image Worlds*, 34.

Similarly, Elspeth Brown explores the use of photographs in the management of the workforce in North American corporations at the end of the nineteenth century. Her book, *The Corporate Eye* (2008), places photography at the centre of the discussion of how late-nineteenth-century corporations used photography as an effective advertising, staff-management, and recruitment tool. Brown's exploration of photography in corporate America builds upon Nye's study of General Electric, looking in particular at the processes of staff recruitment and management through the lens of photography. Standardisation and efficiency, Brown argues, were key aspects of the reform of corporate employee recruitment in the US. Scientific methodologies based on industrial psychology were employed to vet and select applicants from large pools of potential employees. Photography, seen as an innovative method to screen applicants, is represented here as a visual methodology which enabled "character-reading", a crucial element of the recruitment process.[10] *The Corporate Eye* presents the reader with a detailed account of industrial recruitment processes, and applications of photography to various aspects of running a corporation including staff management through staff magazines, product advertising, and even criticism of labour conditions, as the author exemplifies with reference to the work of Lewis Hine. Brown's approach dissects the corporation's uses of photography beyond the creation of photographic records, revealing their part in the scientific management and rationalisation of the workforce.

A different take on the use of photography by corporations in the late-nineteenth-century is presented in Louise Purbrick's study of a photographic album depicting the extraction of nitrate in the Atacama Desert in Chile. Several themes run through Purbrick's article: the visualisation and representation of landscape and industry, and

[10] Elspeth Brown, *The Corporate Eye: Photography and the Rationalization of American Commercial Culture, 1884–1929* (Baltimore: Johns Hopkins University Press, 2005), 25.

the impact and legacies of industrialisation in the landscape. Purbrick also shows how photography, and photographic records can be used to frame both the past and the future.[11] Produced in a context similar to that of the Pearson albums, the album, "Oficina Alianza and Port of Iquique 1889" features 90 photographs depicting the extraction and transportation of nitrate from the Atacama Desert in Chile to London. Purbrick presents a thorough analysis of the album in its entirety. In paying close attention to visual and material qualities of the photographs, Purbrick outlines some of the most prominent visual narratives present in the album, showing how human and industrial interactions in the Atacama desert, and the legacies of industrial processes of extracting and transporting nitrate are visible in the landscape today. Tensions between the past and the future, represented in the photographic album as a repository of the past, yet appealing to the future, are concerns Purbrick focuses on. In "Nitrate Ruins", consideration for the wider political and financial contexts in which nitrate was mined and sent to London is brought to the surface, demonstrating the role photography played in British capitalist pursuits in Chile in the late-nineteenth century. In linking photography as a contemporary art practice, and the decay of industry as a favoured subject matter, to nineteenth-century industrial photography, Purbrick opens a window of inquiry into modern discussions and engagements with the visual representations and the social legacies of declining industries, such as mining.

Eric Nystrom, meanwhile, has looked at the extensive production and use of visual materials, including photographs and maps, in the mining industry in North America during the same time period. As Nystrom notes, visual materials were an integral part of

[11] Pubrick, "Nitrate Ruins," 255.

the institutional discourse and visual culture of the engineering profession.[12] In *Seeing Underground* Nystrom explores the creation and use of maps and models by mining engineers to support miners who often excavated at great depths. Looking at the history of mining in the USA, Nystrom's study of maps and models presents contemporary accounts of the need for underground mapping as a managerial tool. With the aid of underground mapping, spaces that were on one hand unknown were safer to manoeuvre, and, on the other, maps geological characteristics and the physical layout of spaces that were difficult to navigate unaided to the surface. Moreover, maps, as Nystrom and others have argued, greatly facilitate the process of visualising and learning about geographically distant places.[13] While Nystrom's monograph focuses on the technological and economic contexts which supported the development of mine mapping and three-dimensional model making, his 2007 doctoral thesis, *Learning to See: Visual Tools in American Mining Engineering, 1860–1920* places emphasis on the use of photography in underground mining. Here, Nystrom is generous in his analysis of the systems of visualisation and spaces of production, processing, and storage of photographic materials: drawing rooms, darkrooms, and safe vaults.[14] Equally, the *function* of photographs is an enduring concern. Nystrom presents an analysis of the various ways in which photography was able to communicate to various audiences, including its role in mining safety, accident prevention, and the illustration of complex technical terminology or concepts to foreign engineers or miners, among others.[15]Attention is also paid to the use of photographic equipment, in particular, the advances in technology which permitted engineers to photograph underground

[12] Eric C Nystrom, *Seeing Underground: Maps, Models and Mining Engineering in America* (Reno: University of Nevada Press, 2016), 41–42.
[13] Nystrom, *Seeing Underground*, 17; James R. Ryan, *Picturing Empire: Photography and the Visualisation of the British Empire* (London: Reaktion, 1997), 21.
[14] Eric C. Nystrom, "Learning to See: Visual Tools in American Mining Engineering, 1860–1920", (PhD diss., The Johns Hopkins University, 2007), 118.
[15] Nystrom, "Learning to see", 224–25.

successfully. Nystrom credits flash photography and lighter, less cumbersome camera equipment pioneered by Kodak as some of the technological factors which supported the visualisation of underground mining.[16] Running in parallel to the themes in this thesis, Nye's work is equally concerned with the corporate uses of photography by mining company managers. In exploring the corporate processes of internal communication, Nystrom demonstrates not only the crucial role photography played in visualising underground spaces, but equally, how photographs of these spaces constituted a lively corporate visual culture of photographic production and exchange.[17]

Common to the work of Nye, Brown, Purbrick, and Nystrom are two thematic concerns which have a wider relevance here: firstly, the role of photography within the corporate processes of recruitment, staff management, communication, and advertising; and secondly, the diverse material forms in which photographs were produced and reproduced to reach a variety of expert and non-expert audiences. The use of photography in staff magazines, for instance, demonstrates a managerial awareness of how photographs were a powerful tool to communicate messages of corporate unity and ambition to workers. While Pearson does not appear to have had a staff magazine during the period under study, the reproduction of photographs in other material formats such as internal reports and opening ceremony invitations, for example, indicates the same level of corporate awareness of the value of transmitting corporate and technical visual knowledge to both internal and external audiences.

In this thesis, I am not overly concerned with the biographies of the commercial photographers and engineers responsible for the making of the photographs contained in

[16] Nystrom, "Learning to see", 229.
[17] Nystrom, "Learning to see", 239.

the Pearson archive, though, where pertinent and possible, such details of individuals will be provided. Rather than presenting a study of photographic authorship, this thesis seeks to explore what the Pearson photographs *did* in their previous existence as part of the firm's private archive and what they *do* in their present incarnation as a research collection in a public institution. This approach contrasts with that of 'canonical' treatments of industrial photography, as for example that presented in the catalogue for the 1988 *Industrial Image* exhibition discussed in the Introduction to this thesis. That catalogue is thorough in its accounts of the history of the technologies, which enabled industrial subjects to be presented in photographic form, and of the careers of notable photographers, commercial and non-commercial, who contributed to the genre. The catalogue also provides a comprehensive and useful timeline of the history of industrial photography in Britain from its beginnings to the 1980s. However, such a framework with its chronological arrangement of data, facts, names, and locations does not address deeper questions about the nature of the relationship between photography and engineering, the social functions of these images, or the types of national and international audiences that photographs of industry reached in the nineteenth and twentieth centuries.

A broader, more 'holistic' approach to the history of industrial photography is needed—one that allows us to engage meaningfully with photographic archives and collections whose social biographies are neither neat nor linear. Moreover, in the case of corporate archives where access conditions—compounded by various layers of archival and curatorial decisions—can hinder the interpretation of photographs, it is important to look more widely at the different stories and histories presented in collections. By placing the material forms and arrangements of photographs at the centre of the

analysis, and by discussing other layers of production and use, we can shed greater light on the intricacies of use, circulation, and consumption.

While I have been critical of 'canonical' approaches to the history of industrial photography in this section, it is nonetheless necessary to highlight how the canon frames and contextualises bodies of work such as those contained within the Pearson collection. Whatever its merits, the biographical approach is problematic in an archival context like that of the Pearson collection where relatively little information exists on the authors of the photographs, the costs of commissioning, or even the broad outlines of the process through which commercial photographers were approached by the company. Here, an awareness of not only photographic practices, but also wider artistic conventions and style is helpful in understanding the depiction of engineering works by commercial photographers. As I shall discuss in Chapter 3, the early photographic representation of the construction of railways (and other types of infrastructure) was heavily influenced by the work of topographic artists: indeed, some of the early adopters of photography were artists themselves. The work of John Cook Bourne, for example, illustrates the overlap between landscape art and the aesthetics of photographic representation. The work of art historians such as Tim Barringer (in *Men and work: art and labour in Victorian Britain*, 2005), or Ian Kennedy and Julian Treuherz (in their catalogue for the exhibition *The railway: art in the age of steam*, 2008), alongside works by historians of technology, such as David Nye's *American Technological Sublime* (1994), provide useful accounts of the significance of artistic convention in the visual depiction of infrastructure. Nye's work in contextualising the awe and wonder that major technological works could inspire is especially relevant as a context for interpreting visual works commissioned to celebrate the opening of bridges, railways, and dams. As I shall develop in Chapter 3, photography played an important

role in the negotiation of the public and the professional image of engineering through the representation of large-scale infrastructural works in Britain as well as the United States.[18]

2.2 Photographic collections, histories, and locations

In general, a collection can be understood as an accumulation of objects that belong to a particular family of materials or contents.[19] In this thesis the term 'Pearson collection' is used to refer specifically to the company's archive: the accumulation of various types of photographic objects and written records collected and stored under the corporate governance of S. Pearson & Son between 1880 and 1930, now in the custody of the Science Museum. This process of amalgamating written records, visual materials, souvenirs, and gifts, was governed by a more-or-less formal corporate policy whereby materials were organised according to type and relationship; the written records were stored together in boxes, while the photographic albums were organised by contract and were not stored with the written records boxes. Notwithstanding the considerable scholarship on museums and collections, academic research on practices of photographic collection in the nineteenth century and on photographic collections in public institutions is relatively limited.[20]

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[18] See Tim Barringer, *Men and Work: Art and Labour in Victorian Britain* (New Haven, CT: Yale University Press, 1999); Michael Freeman, *Railways and the Victorian Imagination* (New Haven, CT: Yale University Press, 2005); Ian Kennedy and Julian Treuherz, *The Railway: Art in the Age of Steam* (New Haven, CT: Yale University Press, 2008); David Nye, *American Technological Sublime* (Cambridge, Massachusetts: MIT Press, 1994).

[19] Laure Boyer, "Collectors," in *Encyclopaedia of Nineteenth-Century Photography*, ed. John Hannavy, 309–12.

[20] See Elizabeth Edwards and Christopher Morton, eds., *Photographs, Museums, Collections: Between Art and Information* (London: Bloomsbury Publishing, 2015); Marjorie Caygill and John Cherry, eds., *A. W. Franks: Nineteenth-Century Collection and the British Museum* (London: The British Museum, 1997); Susan Crane, "The Pictures in the Background: History, Memory and Photography in the Museum," in *Memory and History: Understanding Memory as Source and Subject*, ed,. Joan Tumblety (London: Routledge, 2013); Mark Haworth-Booth and Anne McCauley, *The Museum and the Photograph: Collecting Photography at the Victoria and Albert Museum, 1853–1900* (Williamstown, MA: Sterling

Boyer has shown that the practice of collecting photographs in nineteenth-century Britain was a popular and democratic activity, reflecting a commercial photographic market that catered to many different needs and desires. Alongside the well-developed private market for photography, public institutions were (and are) major collectors of photographs and other photographic objects. The internal histories and policies of public institutions, of course, shape collections in terms of their content and their accessibility. As Edwards and Morton have argued, the presence of photographs in museums, in itself, exhibits a kind of double history: the history of collecting photographs as objects of interest, and the history of photographs within the wider landscape of curatorial practices in museums.[21] In their pioneering study of the history of photographic collections in museums, Edwards and Morton trace the challenges faced by researchers working with photographic collections held by public institutions. These challenges may include a dearth of staff with specific curatorial expertise in the management and conservation of archival photographs, the frequent lack of provenance data relating to the acquisition of collections, and, more often than not, the absence of a comprehensive inventory of the photographs held by the institution. For Edwards and Morton, these issues reflect a historical undervaluing of photographic collections on the part of public institutions, a situation that has only partially been reversed since the

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and Francine Clark Art Institute, 1998); Arthur MacGregor, *Curiosity and Enlightenment: Collectors and Collections from the Sixteenth to the Nineteenth Century* (New Haven, CT: Yale University Press, 2007); Joan M. Schwartz, "We Make our Tools and our Tools Make us," *Archivaria* 40 (1995): 40–74; Abigail Solomon-Godeau, *Photography at the Dock: Essays on Photographic History, Institutions and Practices* (Minneapolis: University of Minnesota Press, 1991); Keith Thomson, *Treasures on Earth: Museums, Collections and Paradoxes* (London: Faber, 2002); Wolfram Kaiser, *Exhibiting Europe in Museums: Transnational Networks, Collections, Narratives, and Representations* (New York: Beghahn Books, 2014); Susan Pearce, *Museums, Objects and Collections: Cultural Study* (Leicester: Leicester University Press, 1992); Susan Pearce, ed., *Interpreting Objects and Collections* (London: Routledge, 1994).

[21] Edwards and Morton, *Photographs, Museums and Collections,* 7.

commercial value of such collections (particularly through their digitisation and commercialisation) has been identified.[22]

Edwards and Morton argue—in parallel with the critique of histories of industrial photography presented above—that a model of social biography whereby the histories of collections are written by tracing a linear sequence of production, acquisition, and assemblage may be inadequate for a nuanced understanding of museum photographic collections.[23] Such an approach, which heavily relies on chronology and provenance to map the biography of a collection, cannot easily account for the multiple copies, editions, and modified reproductions of photographs and their subsequent distribution and circulation through national and international networks and institutions. Here, I shall focus specifically on the question of location in relation to collections present and past, drawing especially on the work of Eleni Papavasileiou and Casper Andersen.[24]

Papavasileiou's study of the so-called David MacGregor maritime photographic collection sheds some light on the importance of the location of a collection, especially in relation to questions of accessibility. Housed today at the SS Great Britain Trust in Bristol, the MacGregor collection of photographs, books, and models has moved from the intimate space of the domestic, a transition from the private to the public domain that echoes in some respects the move of the Pearson collection from the closed space of the company's safe room to a public museum. While there are logistical issues of transport and storage involved in such transfers, they are often motivated by a concern with accessibility—in particular, the arrangements to be set in place in order to ensure

[22] Edwards and Morton, *Photographs, Museums and Collections,* 18.
[23] Edwards and Morton, *Photographs, Museums and Collections,* 10.
[24] Eleni Papavasileiou, "From Private to Public: the David MacGregor Maritime Photographic Collection," in *Photographs, Museums and Collections: Between Art and Information*, eds., Elizabeth Edwards and Christopher Morton, (London: Bloomsbury Press 2015), 83–100; Casper Andersen, *British Engineers and Africa, 1875–1914* (London: Routledge, 2015).

engagement with these objects by a variety of audiences, something that is not easily achievable in the private or domestic space. In the case of the MacGregor collection, notably its maritime photographs, the selection of the SS Great Britain Trust as a location was of particular significance. The site at the SS Great Britain Trust helped to evoke a sense of the collection's wider significance to science and engineering, as well as enabling an 'authentic' connection to be made between the collection, its current location, and the audiences who visit the trust. Here, Papavasileiou's use of the concept of the 'real place', drawing on the work of Kevin Moore, is helpful when thinking about the various types of connections between collections and the sites in which they are located.[25]

Geographical sites that are historically connected to certain kinds of objects may exhibit what Kevin Moore describes as the "power of the real place": that is, the power of mobilising the past in the present through association with spaces of production and creation.[26] Questions of location and space were, of course, important for Pearson PLC, notably in relation to its own historical collections. Correspondence between Pearson PLC and the Business Archives Council from the mid-1960s shows that due to relocating its Westminster offices to The Strand, the firm was eager to gift the photographic and business archive, *and* a six-storey tall set of stained glass windows.[27] The stained glass windows visually depicted an ode to the company's history, featuring portraits of senior management figures (including Samuel and George Pearson, Lord Cowdray's grandfather, and father, respectively) and descriptions of the main contracts ran by the company. Such a collection, it was felt, might best be offered as a gift to a

[25] Papavasileiou, "From Private to Public", 90; Kevin Moore, *Museums and Popular Culture* (London: Cassell, 1997).
[26] Moore, *Museums and Popular Culture*, 135.
[27] See note 18 in Chapter 1.

public institution in Bradford, where the company originated.[28] However, concerns about storage capacity prevented the collection from moving to the North, as very few public institutions in Yorkshire had expressed sufficient interest or had sufficient capacity to manage such a large and diverse collection. And access to the records was something Pearson PLC wanted to ensure was possible. The solution to this issue was to split the collection. As referenced in note 18 of Chapter 1, the glass panels would be housed at Leeds Beckett University, and the photographic and business archives from the company's headquarters on the Strand would be transferred to the collections of the Science Museum.[29] As a public institution located in central London, the Science Museum could better satisfy the requirements of space and accessibility, and given its longstanding ties to science and industry, it was deemed a highly suitable choice to house the collection. Moore's arguments concerning heritage and place thus have some applicability in this case, although it could be argued that the inherent qualities of photographs as museum objects—especially their reproducibility and circulation in a variety of formats—makes a significant difference to discussions over the suitability of particular sites as locations for archival collections.

The location of the archive is, therefore, an important factor to consider in the study of archives and museum collections from the perspective of contemporary heritage practice. Whether we are concerned with the intrinsic historical connection between site and museum object, or the particular associations between the space, the object, and its audiences, the issue of location makes a difference to how collections are interpreted and used. In this thesis, the collection in question is examined principally as a working archive during the heyday of its management by the Pearson Company, between 1880

[28] Business Archives Council Archives, General Correspondence (Box 12).
[29] Business Archives Council Archives, General Correspondence (Box 12).

and 1930, four decades before its transfer to a museum context. The circulation of technical and commercial knowledge during this former period was also very much shaped by questions of power and location, though the context was very different. In his study of the relationship between Westminster, the capital of British politics, and the work of British engineers in Africa, the historian Casper Andersen argues that location played an important role in wider British commercial and imperial policy-making. In particular, Andersen explores how the location of government in Westminster, as a very specific political hub of the UK and the British Empire, shaped the development of national and global professional networks of engineers whose work was closely tied to policy makers and parliamentarians who ultimately approved the construction of rail lines and other infrastructure. The close relationships between the government (Whitehall, the Foreign Office, and other departments), the engineering industry (including engineering offices, engineering consultants, and professional engineering bodies), and makers of technical instruments in central London were substantially enabled by their spatial proximity.[30] The location of Pearson's headquarters in Parliament Street, Whitehall exemplifies the points made above.

2.3 Questions of form: the photographic album

As photographic albums constitute the major part of the Pearson photographic archive, the significance of the album as a specific material form needs to be considered in the light of recent work by historians of photography. It has taken some time for photographic albums to be engaged with in their own right as objects of academic study. As Patrizia Di Bello has argued, the study of photographic albums, especially those

[30] Andersen, *British Engineers*, 57–86.

beyond the realm of cartes-de-visite albums, is significantly underdeveloped.[31] From the mid-nineteenth century, albums designed to house and display the popular 2 ½ × 4-inch photographic visiting cards were widely consumed by Victorian audiences. Photographic albums have been studied and conceptualised in a broader sense, especially as they were used in a wide variety of social, institutional, and commercial contexts. Di Bello, for example, has linked historians who have undertaken research on photographic albums, such as Alison and Helmut Gernsheim (known for their thorough scholarship on early British Victorian photography), the German-born French photographer Gisele Freund, and Beaumont Newhall (who curated the first major museum retrospective on photography at the Museum of Modern Art in New York) to an orthodox view of the artistic worth and function of these albums: "The Gernsheims, like Freund and Newhall, construct an account of nineteenth-century photography in which the artistic value of images diminishes as their commercial function increases".[32] That is to say, the most influential art historical approaches to photographs have evaluated their significance strictly in relation to their worth and functions as individual images, not as albums—an approach clearly much less relevant to albums produced outside of 'artistic' contexts, as is the case with the Pearson albums. Furthermore, the question of value cannot be seen independently of the economic circuits in which the business of photography was enmeshed: as Deborah Poole has argued, photographs accrue value not only through their representational qualities, but also through their exchange and consumption as commodities.[33]

As Martha Langford and Jane Rutherston have further highlighted, photographic albums can also pose very particular interpretative challenges for historians of photography.

[31] Di Bello, *Women's Albums,* 16.
[32] Di Bello, *Women's Albums,* 16.
[33] Poole, "Equivalent images", 115.

The usual scarcity of provenance, or other information relating to their social biography, the frequent lack of evidence concerning authorship, and the common absence of documentary evidence concerning the dates photographs or albums were made present considerable difficulties, which may be compounded by the need for specialist advice from conservators and others on the material composition and commercial purposes of the albums.[34] In some circumstances, the fragile condition of the albums, including the binding, mounting, and paper itself may cause archivists to recommend limiting the type and degree of access to albums in collections; in such circumstances, the availability of digitised copies usually provides only a partial compensation for the loss of key information concerning their material qualities. In the case of the Pearson albums, which are well conserved, access is not a problem, though the absence of documentary evidence concerning authorship of individual images, typical of albums of this type, may limit what can be said about the endeavours of the company, restrictions given to the photographer, and experiences of individual photographers and users of the albums.

Nonetheless, the sheer volume of images (12,810 placed in albums, excluding loose prints 'scattered' throughout the collection) in the Pearson archive, and the energy devoted to their gathering into a series of albums in itself provides evidence of the significance of photography for the company. Indeed, the lack of information concerning individual authorship may tell us something important about corporate attitudes towards the role and function of the photographs. Once prints supplied to the head office were separated from correspondence and placed in albums, the idea of

[34] Martha Langford, *Suspended Conversations: The Afterlife of Memory in Photographic Albums* (Montreal: McGill-Queens University Press, 2001), 3–21; Jane Rutherston, "Victorian Albums Structures," *The Paper Conservator* 23, no.1 (1999): 13–25. See, also, Anna Dahlgren, "Dated Photographs: The Personal Photo Album as Visual and Textual Medium," *Photography and Culture* 3, no. 2 (2010): 175–94; Mette Sandbye, "Looking at the Family Photo Album: a Resumed Theoretical Discussion of Why and How," *Journal of Aesthetics & Culture* 4, no. 1 (2014): 1–17.

crediting the member of staff who actually took the photograph (perhaps by means of a caption) was redundant. Once placed in the album, the photograph became part of a wider visual narrative that did not require individual photographic authorship to be acknowledged. In the context of the album, the firm was the author, not the individual. Moreover, the function of the photographic record was less to present the work of named individuals than to document and celebrate the engineering work of the company, whether for internal purposes or for an external client: naming the author of a photograph evidently added no value for the audience for whom these albums were produced.

Thus authorship was not the most fundamental consideration in Pearson's internal photographic practices. More specifically, photographic and album authorship were not factors that determined how photographs were used, read, and assembled into continuous series. Similarly, the lack of direct archival evidence in relation to album production suggests that the process of creation was fully integrated in the company's commercial practices of client management and internal communication; it was simply too commonplace an activity to merit authorial credit and recording for posterity. Of course, the absence of a substantial archival trail concerning the process of album production, including the choices made about their form and content, does not mean that evidence is entirely lacking. As I show more fully in Chapter 4, the material qualities of the Pearson company albums themselves can shed light on questions of intentionality, production, and consumption, suggesting (in this case) that the majority of the albums were produced in-house by staff in the drawing department.

Julia Peck's analysis of an early twentieth-century fieldwork album authored by the Australian ornithological photographer J.S.P. Ramsay, considers social networks and

materiality as ways to approach an album produced in a scientific context.[35] Peck's study starts with a description of the album's material qualities: album size, number of photographs, markings, captions, the index, and a list of featured birds. Peck has also noted that the album features unexpected photographs such as images of survey equipment and family and friends, showing the broad and often intersecting networks of photography and ornithology in Australia, and further blurring the lines between albums produced in domestic contexts and albums produced for corporate or scientific ends.[36]

These sorts of late nineteenth-century photographic albums, and their modes of production and consumption, can be thought about using Michel Frizot's concept of photographs as "working documents".[37] While the next subsection of this chapter will look more closely at the spaces where family albums and corporate albums were made and viewed, it is worth spending some time on Frizot's idea of photographs as documents. In particular, it helps tie together photographic albums and administrative and bureaucratic practices in the late nineteenth century. As Alistair Black, Dave Muddiman and Helen Plant have noted, nineteenth-century Britain saw the standardisation of measurements and time, and the increasingly efficient collection and processing of information through censuses, surveys, and the creation of the General Register Office and the Civil Service Commission.[38]

Contemporary businesses also adopted the forms of bureaucratic rationalisation which happened in government. By the end of the 1800s, the use of standardised printed forms, photographic reports and carbon paper, in conjunction with the telegraph meant

[35] Julia Peck, "Family and Fieldwork: JSP Ramsay's Photograph Album" in *The Photograph and the Collection,* ed., Graeme Farnell (Edinburgh: MuseumsEtc, 2013), 60-95.
[36] Peck, "Family and Fieldwork", 62.
[37] Michel Frizot, ed., *A new History of Photography* (London: Konemann, 1998), 12.
[38] Alistair Black, Dave Muddiman and Helen Plant, *The early information society: information management in Britain before the computer* (London, Routledge, 2016) 28-29.

that business were able to process information in a way that was standardised and time saving. The introduction of the vertical filing system in particular, changed how documents were indexed, filed and stored for easier access.[39] It is important to consider the use of photographic albums in bureaucratic spaces as documents which were produced alongside other administrative tasks of information gathering, compiling and storage. Looking at albums produced in corporate spaces where standardisation and efficiency were paramount provides a counterpoint to scholarly research on nineteenth- and early twentieth-century photographic albums which has focused predominantly on albums produced in private and familial contexts from the 1850s to the 1930s. Employing a variety of approaches, Martha Langford, Patrizia Di Bello, Elizabeth Siegel, and others, have examined a multitude of roles photographic albums played in personal and domestic spaces and networks. In their approaches to family album production, attention has been paid to the physical spaces in which photographic albums circulated in the past and in the present, the gendered and social nature of photographic album compilation, and the status of albums as material signs of the experience of modernity in the domestic environment.

2.3.1 Spaces of album production and consumption

The spaces in which photographic albums were assembled and consumed, such as the home, play a significant role in understanding how photographic albums performed as objects of affect and social status. In her examination of nineteenth-century American cartes-de-visite albums, Siegel argues that the assemblage of photographic albums was built on earlier traditions of collecting and displaying objects in bound volumes. This process of album assemblage, Siegel argues, effectively replaced the bible, originally

[39] Black, Muddiman and Plant, *The early information society*, 113-114.

the centre piece in the home, as "the repository of family portraits" in the mid-nineteenth century.[40] The cartes-de-visite albums discussed by Siegel—characterised by sophisticated materials, elaborate leather covers, and metal clasps—were materially representative of the owner's access to high-quality stationery and, as a consequence, spoke to the quality of their social class, leisure activities, and cultural pursuits.[41] Similarly, the consumption of travel photographs in the form of albums or stereocard collections became a popular practice in the Victorian period. As a "surrogate for travel", photographs warped time and space allowing viewers, often congregated in the parlour of the home, to experience foreign locations virtually, gaining knowledge through visual imagery without the physical requirement to travel—a practice that was part of a collective experience in the construction of imaginative geographies.[42]

While the Pearson albums were not designed to be 'travel' albums, the photographs of infrastructure and work in progress in the albums can nevertheless be seen as part of the same production, movement, and consumption of knowledge through visual materials described by Schwartz. Assembled and circulated to provide management and clients with visual updates on progress, these photographs of infrastructure and oil exploration performed in much the same way Schwartz has argued that photographs transformed the way that "geographical knowledge was constructed by travellers and by armchair travellers".[43] The same assumptions about "virtual witnessing"—the use of photographs as surrogate knowledge of distant places—were at work in the logic of the Pearson albums, whereby commercial and engineering knowledge was co-constructed by engineers working on site, and by London-based senior management who, through

[40] Siegel, *Galleries of Friendship and Fame*, 119.
[41] Di Bello, *Women's Albums*, 31.
[42] Joan M. Schwartz, "*The Geography Lesson*: Photographs and the Construction of Imaginative Geographies," *Journal of Historical Geography* 22 (1986) 16–45.
[43] Schwartz, "*The Geography Lesson*", 31.

photographs, correspondence, and illustrated reports, were able to scrutinise progress against contract budgets and timescales.

A key theme of the historical literature on photographic albums is in the social dynamics of album production, in particular, the role women played in the making of family albums. For example, Patrizia Di Bello has defined album production in the nineteenth century as an individual, aristocratic pursuit, whereby women documented family genealogy, hobbies, and personal tastes visually and materially. What made album-making a feminine pursuit, Di Bello argues, was the social endorsement of practices of collecting and recording family life which positioned photographic albums as a material repository of family memories—an act associated with middle- and upper-class lifestyles.[44]

Di Bello's assertion that album authorship was a mainly female pursuit is problematic when extended to albums produced outside domestic or familial contexts. As photographic documents compiled in a commercial environment, for example, the Pearson albums depart substantially from the individual-centred, family-led, socially approved production of family albums examined by Di Bello and others. The form and content of the Pearson albums displayed multiple influences reflecting the company's role as a global corporation. These included processes of interdepartmental and professional collaboration in the process of album production, circulation, and consumption; the agency of engineers and managers engaging with photography as a routine matter of business practice; and the various functions of albums as visual memoranda for staff, as evidence in legal disputes, as objects of corporate affect gifted to clients and colleagues, as record keeping, and as a tangible memorialisation of

[44] Di Bello, *Women's Albums and Photography,* 32.

Pearson's own corporate identity as a prestigious global contractor. Commercial and technical imperatives underpinned the company's requirements for systematic, reliable visual documentation of the progress and realisation of its various engineering works.

While some aspects of the form and functions of the commercial photographic album were distinct, they were produced like the domestic albums according to a systematic and uniform design. Albums became popular consumer items from the mid-nineteenth century when the mass production of stationery products developed in volume.[45] Moreover, albums were tangible products of modernisation and advancement in technologies of paper making, printing, and binding such as the introduction of cloth bindings in 1825, the improvement of embossing techniques in the 1850s, and wood-pulp paper production in the 1870s.[46] As Siegel notes, photographic albums were mass produced in standardised sizes which gave consumers freedom of choice in the arrangement and display of photographs. Similarly, uniformity, standardisation, systematic organisation, and interchangeability are also characteristics of engineering practices. Clear, concise, and systematic organisation of visual materials, such as photographs, maps, and diagrams not only are evident in the Pearson albums in relation to how the photographs are placed, captioned, and organised, but are also part of wider album assembling traditions in the engineering industry more generally.

In the arts and humanities, the historical study of photographic albums is usually conceived in an intellectual framework emphasising the role of gendered identities, domestic space, and narratives of familial memory embedded within a modernising consumer culture from the middle decades of the nineteenth century. The Pearson

[45] Rutherston, "Victorian Album Structures", 15; Siegel, *Galleries of Friendship*, 95.
[46] Rutherston, "Victorian Album Structures", 16.

albums, and albums of industrial imagery more generally, have their origins in the same period yet clearly belong to a distinct category of their own. The industrial album emerged in a commercial context in which the documentation of the progress of infrastructural engineering projects was essential; it was produced collectively as a standardised work of record rather than as an artefact of individual or familial memory; and it circulated within and beyond corporate offices both as a repository of visual knowledge and as an object of affect, gifted to senior engineers, client representatives, and other corporate bodies.

***

This chapter has sought to situate the body of research in this thesis within the wider literature on industrial photography, albums, and collections. I have argued throughout this chapter that notions related to industrial photography and photographic collections can and should be re-thought bringing the materiality of the photographic archive to the forefront of the academic dialogue. In doing so, I have demonstrated that alternative histories, often hidden under layers of archival editing, movement(s) between spaces of production and consumption (i.e. from the domestic space to cultural spaces), and the material qualities of the archive itself, can be 'uncovered', as it were. By challenging the canon of industrial photography—the skilful Victorian engineer and the masterful photographer—greater insight is given into the complexity and depth of the relationship between engineering and photography. Chapter 3 builds precisely upon this. The relationship between engineering and photography was socially and professionally

intertwined, not only in the types of practices both disciplines shared, but also in how photography proved to be a valuable technological asset to engineers and engineering companies. Chapters 4, 5, and 6 look more deeply into the functions of the albums as repositories and channels of communication, for both internal and external audiences.

Chapter 3: Engineering and photography: contexts, practices and networks

On 12 May 1840, almost a year and a half after the director of the Paris Observatory, François Arago, announced news of Louis Daguerre's daguerreotype photographic process to the Académie des Sciences in Paris, the British engineer Alexander Gordon addressed his peers at the Institution of Civil Engineers in London on "Photography as applicable to engineering".[1] In the opening paragraph of his paper, Gordon outlined the benefits which civil engineers could draw from the new medium, citing accuracy, speed, and "comparatively small expense" as the advantages offered by photography as a new representational method over other techniques that had long been used in the engineering industry by artists and engineers, such as sketching and oil painting.[2] Alexander Gordon's talk, the first formal reference to photography in a paper presented to members of the institution, opens an intriguing window of inquiry into how civil engineers as professionals engaged with photography after 1840. At face value, his paper presents photography as a convenient and efficient technology for engineers to use in their day-to-day work. Photography as a convenience, as a cheaper and more efficient technology of visual representation, is one of the aspects of what I argue was a relationship of co-operation between the engineering industry, civil engineers, and photography. Gordon's paper frames what engineers *needed* from photography in the period: affordable, fast, and 'accurate' depictions of construction progress, finalised infrastructure, opening ceremonies, and so forth. The need for visual and material representations of various construction phases reflected corporate interests and objectives within the industry's wider professional practices of record taking and

[1] Alexander Gordon, "Photography, as Applicable to Engineering," *Minutes of the Proceedings of the Institution of Civil Engineers* 1 (1840): 57. On the announcements of the daguerreotype and the calotype processes see, also, Roger Taylor, *Impressed by Light: British Photographs from Paper Negatives, 1840–1860* (New York: Metropolitan Museum of Art, 2007).

2 See John Hannavy, "John Cooke Bourne, Charles Blacker Vignoles and the Suspension Bridge at Kyiv," *History of Photography* 28 (2004): 334–47 and Michael Freeman, *Railways and the Victorian Imagination* (New Haven, CT, Yale University Press, 1999).

keeping, client communication, internal management systems, budgets, construction materials, and publicity.

In this chapter, I argue that the relationship between the engineering industry and photography in the nineteenth century was more nuanced than Alexander Gordon's paper might suggest. An early example of the type of interwoven professional and social connections between the engineering industry and photography can be seen in Gordon's own career. Educated at the University of Edinburgh, he played a part in various professional networks as a member of the Institution of Civil Engineers and as a Fellow of the Royal Geographical Society. It is, however, his role in the formation of the Polytechnic Institution in Regent's Street, London, that warrants some attention here. Created in 1838, the Polytechnic Institution was formed by a group of notable scientists and engineers, including Sir George Caley and Alexander Gordon who became one of the institution's directors.[3] From its inception, a year before Arago's announcement of the daguerreotype, the institution's core concern was the advancement of 'practical science', particularly in the fields of agriculture and manufacturing. In October 1839, photography classes (including practical demonstrations) were offered on the prospectus. J. T. Cooper, a chemist at the polytechnic was responsible for teaching the subject.[4] The polytechnic was a place to not only learn about natural philosophy, atmospheric railway, chemistry, and photography—but also a space where audiences interested in science and photography would congregate too.[5] Almost two years later, the connection between the polytechnic as a space of scientific learning and the new technology of photography was reinforced by the opening in March 1841 of the UK's

[3] Brenda Weeden, *The Education of the Eye: History of the Royal Polytechnic Institution 1838–1881* (Cambridge: Granta Editions, 2008), 27.
[4] Weeden, *Education of the Eye*, 37.
[5] Sir John Herschel and Henry Fox Talbot were some of the visitors to the Polytechnic. See, Weeden, *Education of the Eye*, 37–38.

first public portrait photographic studio on the premises of the institution in central London.[6] Built on the roof of the polytechnic (Figure 3.1), the construction of the studio was funded by Richard Beard, who had amassed his wealth through business interests in the coal industry, and was a keen enthusiast of photography. While Steve Edwards has remarked that Beard's interest in the medium was purely financial—there is no evidence that he actively took photographs—Beard's legacy in photographic history is considerable thanks to his purchase of licenses which allowed him to open several photographic studios.[7] A notice in the *Morning Advertiser* newspaper dated August 1841, the same year the Polytechnic Institution studio was opened, gives an indication of the type of photographic services offered:

> DAGUERREOTYPE and PHOTOGRAPHIC PORTRAITS are taken by the sole patentee, RICHARD BEARD, at the Polytechnic Institution, Regent Street. Richard Beard is possessed by two patents by the combined operation of which he is enabled to produce portraits and other representations in a greater degree of perfection than can be produced by other process. R. B. is the only person by whom licences can be granted to use the patents in provincial towns—London, July, 1841.[8]

While the exact part played by Alexander Gordon in the creation and management of Beard's photographic studio in unknown, his lecture to the Institution of Civil Engineers in May 1840 demonstrates the close relationship between engineers and the emergent

[6] See, *Prospectus of an Institution for the Advancement of the Arts and Practical Science, 5 Cavendish Square, and Regent Street, London.* RPI/2/8 University of Westminster Archives; Stephen Edwards, *The Making of English Photography: Allegories*, (Pennsylvania: Pennsylvania State University Press, 2006), 2.
[7] Edwards, *The Making of English Photography*, 2.
[8] "Daguerreotype and Photographic Processes," *Morning Advertiser*, August 1841, The British Newspaper Archive.

field of photographic practice. Gordon may well have been directly involved in Beard's studio; his interest in photography—as demonstrated in his paper to the Institution of Civil Engineers—and his involvement in the creation and direction of the Polytechnic Institution shows how photographers, engineers and businessmen worked closely together through common professional networks.

Photography's reputation for 'realism' and 'accuracy' amongst engineers needs to be placed in the broader historical context in which engineering relied on various forms of visual technology in the making and presentation of its technical and professional practices. In order to untangle some of the strands of this ongoing relationship, this chapter first considers the role of visual artists in the presentation of the work of railway engineers from the 1820s onwards (section 3.1). Artistic techniques, including drawing, sketching, and oil painting were the industry's preferred representational methods prior to the development of photography. These various techniques served different purposes for a variety of audiences. Sketching in pencil, pen, and watercolour, for instance, allowed engineers to represent visually in a cost-effective and rapid manner both natural and man-made phenomena in the field. In contrast, oil paintings were used in a more formal, artistic context for a wider audience more concerned with landscape aesthetics.

Oil paintings by artists such as J. M. W. Turner, and prints by lithographers such as J.C. Bourne constitute here the canon of artistic representations of the railway in the middle decades of the nineteenth century.[9] The existence of a corresponding photographic canon of industrial scenes from the 1850s leading to the 'Golden Age' of engineering—

[9] Ian Kennedy and Julian Treuherz, *The Railway: Art in the Age of Steam* (Newhaven, CT: Yale University Press, 2008); Glenn Willumson, *Iron Muse: Photographing the Transcontinental Railroad* (Berkeley: University of California Press, 2013); Stephen Daniels, "J.M.W Turner, and the Circulation of the State," in *Fields of Vision: Landscape Imagery and National Identity in England and the United States* (Cambridge: Polity Press 1993), 112–45.

including the work of photographers such as Philip Delamotte and Robert Howlett—demonstrates the popularity of visual representations of railway infrastructure among Victorian audiences. While the present study of the Pearson collection seeks to go beyond canonical representations of industrial photography (as I argued in Chapter 2), it is nonetheless necessary to understand the currency of these types of images in order to adequately contextualise the Pearson collection in relation to wider traditions of visual representation of industrial technology.

Having established the representational currency of visual images of engineered landscapes for a wider public, the chapter then considers how techniques of visual representation (specifically photographic techniques) were taught to engineers during the late-eighteenth and nineteenth centuries (section 3.2). The inclusion of technical and landscape drawing in engineering curricula evidences the academic and professional value placed on *seeing* and being able to *represent* natural and man-made phenomena, either through drawings on paper or three-dimensionally in the form of models. Crucial to engineering practice was technical proficiency in developing ideas and the ability to represent the progress and completion of works through graphic and material media. As part of their professional training, engineers were taught how to see and record phenomena according to scientific standards adopted by military academies. Curricula in military and naval training schools, where most British engineers in the late-eighteenth and early-nineteenth centuries were educated, included teaching on practical drawing skills and knowledge of topography, mapping, perspective, shade, and colour.[10] Equally, the study of chemistry, another key subject in engineering curricula, gave engineers the expertise and technical confidence necessary to engage with early

[10] Kim Sloan, *'A noble art': Amateur Artists and Drawing Masters, c.1600–1800* (London: British Museum Press, 2000), 104–8; Celina Fox, *The Arts of Industry in the Age of Enlightenment* (New Haven, CT: Yale University Press), 362–78.

photographic processes, such as the daguerreotype, the calotype, and the wet-collodion process, that required familiarity with chemicals and reactions.[11] Thanks to their knowledge of science and technology, engineers had the expertise and technical prowess to be able to engage confidently with early photographic processes.

Having established the significance of visual technologies for the representation and practice of civil engineering in the period, the chapter then considers engineers' social and professional networks between 1839 and the 1850s, looking in particular at the ways in which they engaged with commercial photographers (section 3.3). Social networks provided a fertile environment for engineers to develop and demonstrate their knowledge of the new medium, through participation in exhibitions, the exchange of ideas, and, perhaps most importantly, involvement in photographic social networks that exposed engineers and commercial photographers to common business opportunities.[12]

The final part of this chapter turns to the practical applications of photography in the business of engineering in the second half of the nineteenth century (section 3.4). Here,

[11] The daguerreotype, a direct positive photographic image was invented by Louis-Jacques-Mandé Daguerre. Unlike Henry Fox Talbot's calotype process, Daguerre's process did not require a negative to produce an image. To produce the image, a silver-coated copper plate was polished to obtain a glossy, mirror-like finish. In the darkroom, the plate was sensitised, ready to be exposed in the camera. After being exposed (times varied on lighting conditions, and the subject matter), the plate was returned to the darkroom where the fumes from heated mercury would 'reveal' the image. A fix bath was then applied to the plate. Talbot's calotype process, or paper negative process, was a six-step activity. To create the paper negative a sheet of good quality writing paper was treated with silver nitrate and potassium iodide. The iodised paper was then sensitised by brushing a mixture of silver nitrate, acetic acid, and gallic acid. At this stage of the process, it was important that the moist, sensitised paper was placed in the back of the camera to be exposed. The exposed paper, now a negative, was developed by applying another coat of silver nitrate, acetic acid, and gallic acid. A hot bath of sodium thiosulphate was required to fix the image. To create positive copies from the paper negative it was necessary to place the paper negative in direct contact with a sheet of paper which had previously been sensitised (brushed with salt and a solution of ammonium-nitrate of silver). The wet-collodion process, patented by Frederick Scott Archer in 1851, was a popular photographic process by which a high-quality negative was produced by coating a glass plate with collodion (binding agent), followed by sensitising the plate with a solution of silver nitrate before placing the plate in the camera holder to be exposed. Exposure times varied from a few seconds to a couple of minutes—a clear advantage over other processes, such as the daguerreotype and calotype that depending on the subject matter required longer exposure times. See James M. Reilly, *Care and identification of nineteenth-century photographic prints* (Rochester: Eastman Kodak, 1986); Taylor, *Impressed by Light*, 16.

[12] Taylor, *Impressed by Light*, 30–43; 56–72.

I provide a wider context for the discussion of the corporate applications of photography as evidenced in the Pearson collection—especially the creation, circulation, and consumption of photographic albums designed to convey a curated, corporate image of excellence, efficiency, and prestige—in the subsequent chapters of the thesis. This wider context includes consideration of photography's other roles within engineering, including as evidence in legal disputes between contractors and clients, as an integral component of practices of corporate insurance, in safety demonstrations, and in trade and education literature.

3.1 Engineering companies, railways, and artists

In the course of the nineteenth century, fertile investment prospects supported development in the industrial sector, steam power expanded and accelerated the domestic and international transport of passengers and goods through railways and steamships, and long-distance communications made the world better connected and more accessible than ever before. Moreover, Britain's expanding empire created opportunities for engineers and entrepreneurs seeking to exploit new opportunities by extending the new infrastructure on a global scale.[13] As Casper Andersen has shown, the proliferation of British-led engineering projects both within Britain and across the wider empire, culminated, towards the end of the century, in what has been called the 'Golden Age' of engineering.[14] Notwithstanding the widespread construction of railways, dams, bridges, and tunnels—often represented as the cornerstones of progressive and modern nation states—the first wave of railway building in Britain was

[13] Andersen, *British Engineers*, 1–2.
[14] Andersen, *British Engineers*, 114.

not met with universal enthusiasm.[15] Railway investors and British legislators who approved parliamentary acts to build rail infrastructure saw railways, unsurprisingly, as full of potential in a blooming free market: a viable transportation infrastructure that shortened transit times of manufactured goods and passengers between the country's main cities and ports.[16] The implementation of rail in Britain was, therefore, welcomed by contractors, engineers, lawmakers, and investors—each of whom had vested financial, social, and political interests in its success. However, a wider constituency of land owners directly affected by the construction of rail lines, businessmen with conflicting commercial interests, such as Turnpike trusts, and assorted other commentators were much more sceptical. In one strand of cultural commentary, the coming of steam-powered transport was greeted with alarm and concern for the future of the rural landscape—the railway symbolising a new 'mechanical age' in which nature was subdued by technology.[17] In subsequent decades, this presentation of the power of new industrial epoch developed in a larger context, often in more positive visions of what David Nye calls the "technological sublime", in which the machine, and industrial infrastructure more generally, were portrayed as transformative agents of progress, "taming" the forces of nature in the name of modernisation and progress.[18]

In the face of both concerted resistance and wider concerns over the social and cultural impact of industrial technology, railway companies deployed a campaign of persuasion to shift public perception of rail transportation from being unsafe, unsanitary, and environmentally disruptive, to being secure, pleasurable, and practicable. One strategy in this campaign was to re-frame negative railway perceptions through the use of visual

[15] Michael Freeman, "The Devil's Mantle: The Railway as a Cultural Metaphor," in *Railways and the Victorian Imagination* (New Haven, CT: Yale University Press, 1999), 18–37.
[16] Adrian Vaughan, *Railwaymen, Politics and Money: the Great Age of Railways in Britain* (London: John Murray, 1997), 92.
[17] Freeman, *Railways*, 232.
[18] David E. Nye, *American Technological Sublime* (Cambridge, MA: MIT Press, 1994), 1–16.

representations of railways in familiar landscape settings – notably, through the circulation of readily-available lithographic reproductions of commissioned paintings of rail lines. Artistic depictions of railways passing through scenic landscapes conveyed an aesthetically pleasing message of security, progress, and convenience to counter fears and doubts brought by "something that apparently moved without natural cause".[19]

The effort directed to persuading audiences of the benefits of rail resulted in an estimated sale of two thousand railway-themed lithographs between 1824 and 1844.[20] One prominent example of a work designed to change sceptics' perceptions of rail, and illustrating the co-operative relationship between railway companies and artists, is the 1838 publication *A series of lithographed drawings on the London and Birmingham Railway*—a book featuring reproductions of watercolours by John Cooke Bourne and text by the antiquarian and topographer, John Britton. It was Britton who persuaded the London and Birmingham Railway board to commission Bourne to document various stages of the construction of the line with the objective of presenting the work to the general public in the form of a book. The resulting work is significant in several respects. Its depiction of the various stages of construction of the railway line connecting the capital to one of Britain's foremost industrial cities demonstrates an awareness of the potential of the format to reach a wide audience. Equally, the success of the reproduction of Bourne's railway sketches cemented his reputation as a well-known railway artist, leading to further commissions for similar work on prestigious infrastructure projects such as the construction of the Great Western Railway in 1846.[21]

[19] Gareth Rees, *Early Railway Prints: a Social History of the Railways from 1825 to 1850* (London: Phaidon Press, 1980).
[20] Freeman, *Railways*, 215.
[21] Freeman, *Railways*, 215*;* Stephen Daniels, "Images of the Railway: Nineteenth-Century Paintings and Prints," in *Trainspotting: Images of the Railway in Art* (Nottingham: Nottingham Castle Museum, 1985), 5–18.

The structural similarities between Bourne's watercolour sketches of railway landscapes and the photographic views in Pearson's presentational albums (analysed in Chapter 6) are striking. Viewing Bourne's book as a precursor, in the sense that it provided a structural template of how to convey the visual and material work of contractors, engineers, and company owners in a positive light, makes considerable sense especially in view of the enduring power of such landscape visions.[22] As Hannavy points out, Bourne's body of work was the first comprehensive, purpose-produced-and-commissioned visual study of the various stages of construction of a railway line in Britain.[23] The similarities in structural choices in both the book of prints and the photograph albums—inclusion of captions, medium-to-large sized images, a substantial opening text contextualising the project's origins, purpose, and infrastructure statistics, along with a well-planned visual narrative—indicate, I suggest, a shared model of how visual depictions of industrial landscapes were organised and presented to audiences.

In addition to these common organisational elements, the depiction of the subject matter and the types of views and visual perspectives depicted in Bourne's lithographs are echoed throughout the Pearson albums. Bourne's sketches, taken from vantage points overlooking excavations, tunnel entrances, viaducts, and train stations, presented the viewer with a clear understanding of, on one hand, the sheer scale of human labour involved in excavating tunnels and building railway lines, and on the other, the scale of construction sites. Moreover, they demonstrated the ingenuity and engineering prowess required to overcome challenges presented by the terrain through which the line passed. A similar use of perspective and vantage points showcasing a sense of impressiveness and awe is a common feature of many images in the Pearson albums. The overlap of

[22] See especially Daniels, *Fields of Vision*.
[23] Hannavy, "John Cooke Bourne", 335.

themes and compositional strategies suggests an inherited industrial visual approach. The nature of this shared visual frame is open to further discussion. Freeman, for example, has identified the main aspects of railway iconography in this period as being the use of linearity, panoramas, movement represented from left to right across the visual plane, topographical compositions, and details of construction progress.[24] Missing from Freeman's analysis is, however, the aesthetic of the sublime.[25] In the present context, Nye's understanding of the technological sublime sheds further light on visual representations of railway infrastructure and technology more generally. Nye distinguishes between the arithmetical and dynamic sublime: the first relates to the construction of large-scale man-made infrastructure, such as bridges, dams, and skyscrapers, while the latter denotes the triumph of machines and a transformation in ideas of space and time.[26] While some early visual imagery of railways fits into the category of the sublime as unreal and monstrous, Nye's interpretation of the technological sublime adds further depth to the understanding of the impact of mass-produced lithographic reproductions of the construction of railways. Bourne's study of the London-Birmingham line, as the first dedicated visual representation of the construction of a rail system, clearly belongs to the realm of the arithmetical sublime.

By exposing viewers to the technical and infrastructural processes behind the construction of a rail line, railway owners appealed to the audience's visual curiosity in what was physically distant and exotic, giving viewers the chance to understand visually how rail lines were built, and simultaneously demystifying what had been perceived as a disruptive and untrustworthy form of transportation. As highlighted above, Bourne and Britton's book of lithographs share similar structural features with Pearson's

[24] Freeman, *Railways*, 221.
[25] In addition to David Nye's *The American Technological Sublime*, see, also, James R. Ryan, *Photography and Exploration* (London: Reaktion, 2013).
[26] Nye, *American Technological Sublime*, 56–57.

presentational photographic albums: the formality of their material qualities, organisational structure, types of prints used, and the overarching visual narrative of linear progress. The first impression of *A series of lithographed drawings on the London and Birmingham Railway* is the size of the volume itself. Measuring 21.5 × 15 inches, the burgundy canvas and leather-bound volume is cumbersome and heavy: this was clearly meant as a book to be cherished, rather than regularly transported, to be kept safe and appropriately conserved. The formal visual and narrative tone of the volume is reinforced through a detailed index of Bourne's drawings arranged chronologically. Starting at the beginning of the line in London and ending at the terminus in Birmingham, the index is followed by a twenty-three-page historical account written by John Britton.[27] This lengthy text can be interpreted as the 'scaffolding' to the overarching message of optimism, enthusiasm, and confidence in rail that the lithographs were intended to convey to their audience. Britton's opening paragraph situates steam technology as a natural progression in nineteenth-century technological development. In a fashion similar to previous technologies that seemed uncertain and untrustworthy at their inception, he argued, the railway would ultimately prove to be of tremendous benefit to users in Britain as a whole:

> Amongst all the changes of the civilised and commercial world, there has never been one so eventful and prodigious as that effected by the agency of Steam Engine. This superhuman power has superseded many long-established practices and confirmed customs. The Railway System of the present age has already produced wonderful effects in all the former modes

[27] On Britton as a topographer, see Stephen Daniels, "John Britton", in Bernard Lightman ed., *The Dictionary of Nineteenth-Century British Scientists* (Bristol: Thoemmes Continuum, 2004), 283–87; and in relation to his collaboration with Bourne, see Stephen Daniels, "Mapping the Metropolis in an Age of Reform: John Britton's London Topography, 1820–1840," *Journal of Historical Geography* 56 (2017): 61–82.

> of travelling. Like other great novelties and innovations, it has had to encounter much prejudice end enmity, much opposition and vexatious hostility. So had Turnpike Roads and Canals, when they were respectively introduced; so had Machinery, when first applied to Manufactures; and so had the practice of lighting streets by Gas. These, however, are now become familiar, and are universally admitted to be essential to the political and domestic economy of civilised society.[28]

Two maps of the railway line bridge Britton's text and Bourne's thirty-seven prints of the construction of the railway. The monochromatic prints vary in size between 15 × 9 inches and 10.5 × 7 inches, with either one or two lithographs positioned neatly on the right-hand-side page throughout the book. The types of subjects selected impose a sense of grandiose achievement, echoing Britton's message of the triumph of human ingenuity over nature. The strategic viewpoints from which Bourne sketched demonstrate the sheer scale of the construction sites, thus allowing viewers to see for themselves attributes of construction—including the vast numbers of navvies working on site and the technology used to excavate and move heavy objects around—not otherwise accessible or observable.

Figures 3.2 and 3.3 demonstrate these attributes. In Figure 3.2, the caption below the print indicates authorship and the publication date of the prints: "London. Published 1839, by the proprietor J.C Bourne, 19, Lamb's Conduit Street and Ackerman & Co Strand". A second caption on the lower right-hand corner describes the image and situates it in space and time: "Tring cutting, June 17th, 1837". Sketched from the top of

[28] John Britton, *Drawings of the London and Birmingham Railway, by J. C. Bourne, with an Historical and Descriptive Account by John Britton*, 3, The British Library, shelf mark: 650.b23.

the cutting, Bourne relies heavily in this image on perspective to portray the sequence of ongoing works in this section of the line in Tring, Hertfordshire. A sense of deep excavation work is amplified by the relative size of the navvies working at the centre of the cutting, in comparison to the scale of the excavation. A series of ramps spread in parallel from the foreground to the background of the lithograph provide the viewer with a classic icon of industrialisation: the repetition of lines and structures from the foreground to the background disappearing into the horizon, emphasising the colossal manpower necessary to move debris from the centre of the cutting to its edge, an arrow-straight incision into the landscape. Bourne resorts to simplicity, precision, and geometric convention to portray 'faithfully' the scene.[29]

Figure 3.3 is another example of Bourne's approach to creating imagery that presented the viewer with 'concrete' and 'focused' views of the different chronological stages and physical sites of railway construction. The image depicts two ventilation shafts in the Kilsby Tunnel, running between Rugby and Northampton, in July 1837. In this example, light and shadow intensify the viewer's perception of being underground. The depiction of men at work provides a familiar sense of scale against which the overall vastness and emptiness of the tunnel can be measured and understood. While the first of the two paired images feature heavy repetition of geometric shapes, the second invites the viewer to engage with the different material textures present in the image: puddles of water, smoke, rail tracks, the darkness in the infinite—the coarse finish of the inside of the tunnel walls allude to work in progress, a moment captured in time granting the viewer access to the material crudeness of unfinished work. Waste materials are lifted up to ground level through the shaft in the left-hand image, workers under the natural

[29] Phillip Hatfield, "Colonial Copyright and the Photographic Image: Canada in the Frame", (PhD diss., Royal Holloway, University of London, 2012), 74.

spotlight are seen preparing another load to be raised. The play between darkness and light is captured confidently by Bourne in both images. The circulation of such scenes in print form (here lithographs) continued for much of the nineteenth century. The camera's role was limited by long exposure times, cumbersome equipment, and in the case of the second image here, the challenge of depicting scenes where light was poor or virtually non-existent.

Understanding the contexts in which visual representational traditions were used in depicting railway construction and railway landscapes in the middle decades of the nineteenth century is fundamental to understanding the *need* for and *function(s)* of photography in documenting large-scale infrastructural projects. By considering how visual artists depicted feats of landscape engineering prior to, and contemporaneous with, the advent of the photographic record provides a context for, as well as a contrast with, the subject matter of this thesis.

3.2 Engineering curricula: learning to see

Translating engineering concepts and representing complex technical ideas through visual media, such as technical drawings, maps, diagrams, photographs or models, is an integral part of professional practice in engineering, in both the past and the present. Used both to facilitate communication between engineers, and to convey specialist knowledge to non-expert audiences, visual materials have been used to bring engineering concepts to life, to transmit technical ideas and knowledge, and where necessary, as evidence in legal disputes between engineers and clients. The engineering profession's longstanding production and circulation of such imagery sustains what Nystrom has described as a distinct visual culture across the various sub-fields of

engineering.[30] In this section, I explore how military engineering curricula provided instruction in the use of visual materials and representational techniques during the nineteenth century. The teaching of representational techniques such as sketching in military academies evidences how engineers were taught how to 'see' and represent natural and man-made phenomena on paper according to scientific principles, or learned by direct observations and practice in the case of civil engineers. Formal instruction in, and practical experience of representing infrastructure created a specific culture of landscape within the professional engineering community. The relationship between visual techniques as they were taught in engineering curricula, and their actual use in engineering projects, becomes a key theme in the understanding of the role photography both in the practice of engineers and in the presentation of engineering projects to wider audiences.

There have been significant historical shifts in the role of the engineer and the wider understanding of engineering as a vocation since the eighteenth century.[31] As noted in recent scholarship on the history of engineering, the profession has a longstanding practical and theoretical connection with scientific disciplines such as mathematics, physics, mechanics, and chemistry.[32] Social, economic, political, and technological changes over time have, however, profoundly shaped *what* engineers are able to do, *how* they are able do it, and for *whom*. The process of industrialisation and the wider growth of trade in eighteenth-century Britain, for instance, created a need for engineering expertise, especially in the context of business ventures in transport. Investors in canal transport networks, road construction and improvement, and dock

[30] See, Nystrom, *Seeing Underground*, 4; Antoine Picon, "Engineers and engineering history: problems and perspectives," *History and Technology* 204 (2004): 421–36.
[31] Andersen, *British Engineers*, 5.
[32] See, Picon, "Engineers and Engineering History", 424; John Hubbel Weiss, *The Making of the Technological Man: the Social Origins of French Engineering Education* (Cambridge, MA: MIT Press, 1982), 170; Nystrom, *Seeing Underground*, 47.

systems and maintenance required both specialist technical knowledge to ensure business proposals had parliamentary approval, and proficient engineers to manage the construction of infrastructure.[33] The application of technical expertise to, and oversight of, civilian infrastructure projects underpinned moves towards the professionalisation of engineering, and ultimately enabled the emergence of the civil engineer as a distinct professional category from the military engineer. Later in the eighteenth century, and into the early nineteenth century, as the scale and complexity of construction projects grew, the engineering profession became more diverse in terms of the roles engineers took on, from managerial positions overseeing projects to a wide variety of more specific technical roles.

Organised efforts to shape the profession were eventually reflected in the creation of the Society of Civil Engineers (1771) and the Institution of Civil Engineers (1818).[34] The Institution of Civil Engineers was founded by Henry Robinson Palmer, James Jones, and Joshua Field, and its first President was Thomas Telford. Like other learned societies created during the same period, the institution was established to facilitate the advancement of the discipline and the exchange of civil engineering information and knowledge amongst its members through meetings, lectures, and publications. Eligibility for membership in the institution depended on work experience and required the recommendation of an existing member.[35]

[33] Mike Chrimes, *Civil Engineering 1839–1889: a Photographic History* (London: Alan Sutton, 1991), 16.
[34] The Society of Civil Engineers was founded by two engineers: John Smeaton and Thomas Yeoman. Smeaton and Yeoman were the first engineers to describe themselves as civil engineers, rather than engineers—a blanket description used up to that point to describe engineering both in civilian and military contexts. Chrimes, *Civil Engineering*, 16. On the wider context see Penelope J. Corfield, *Power and the Professions in Britain 1700–1850* (London: Routledge, 1995).
[35] Andersen, *British engineers*, and Hugh Ferguson, *The Civil Engineers: the Story of the Institution of Civil Engineers and the People who made it* (London, ICE Publishing, 2011).

While such efforts to regulate, support, and advance the field of civil engineering helped to create a distinct professional profile, civil engineers unlike their military counterparts lacked formal instruction in engineering, and were primarily taught through the practical experience of learning on the job.[36] In contrast, formal structures of engineering instruction and learning were available through military seminaries, colleges, and academies. The Royal Military Academy, Woolwich (established in 1741), was the best-known institution training artillery officers and engineers, and the topographical artist Paul Sandby was employed as Chief Drawing Master there from 1768 to 1796.[37] Candidates studying engineering at Woolwich came to be known formally as the Ordnance, or "scientific corps", because of the technical nature of their work that distinguished them from other candidates. The minimum admission age to Woolwich was fourteen years, and in addition to their studies of such military subjects as fortification and artillery, candidates were required to undertake exams in subjects including mathematics, English, French, history with geography, natural sciences, and drawing.[38] Once admitted, cadets took theory classes for two to four years before moving onto the practical components of their training. The emphasis placed at Woolwich on both the theoretical and practical aspects of engineering contrasted with the way the Royal Military College, Sandhurst, was later to structure its engineering curriculum. Established in 1801–2, sixty years after the military academy in Woolwich, the military college in Sandhurst offered instruction based primarily on theoretical engineering concepts.[39] However, admission exams to the college required candidates to be proficient in three mandatory subjects (mathematics, fortification, and military

[36] Chrimes, *Civil Engineering*, 36. Military training in draughtsmanship is discussed in Celina Fox, *The Arts of Industry in the Age of Enlightenment,* (New Haven, CT: Yale University Press, 2009), 362–78.
[37] John Bonehill and Stephen Daniels, eds. *Paul Sandby: Picturing Britain* (London: Royal Academy of Arts, 2009), 17.
[38] Fox, *The Arts of Industry,* 369–70; Harold E. Raugh, *The Victorians at War, 1815–1914: an Encyclopaedia of British Military History* (Santa Barbara: ABC-Clio, 2004), 347.
[39] Raugh, *The Victorians at War*, 293–94.

surveying) and three optional subjects from a list that included French, siege operations, landscape drawing, military drawing, general history, and geography, among others.[40] By the beginning of the nineteenth century, then, the Royal Military Academy at Woolwich, and the Royal Military College at Sandhurst were the two main educators of army officers. They were joined in 1809 by a third college, the Addiscombe Military Seminary, founded to train officers for the East India Company army. Located in Surrey, the Addiscombe Military Seminary based its admission, curricula, and teaching structures on the Woolwich model by providing instruction in subjects including mathematics, military and landscape drawing, chemistry, geology, and Hindustani.[41] By comparing the curricula of Woolwich, Sandhurst, and Addiscombe, we can see that the common elements thought to be required for the training of military engineers included mathematics, geography, French, and drawing. The focus on the teaching of draughtsmanship is particularly important in the present context as it indicates the extent to which the practices of scientific visualisation were already an inherent part of what was needed to become an engineer.

The teaching systems and engineering curricula employed by these military academies in the first half of the nineteenth century were not without their critics, however. Critical voices included that of Sir Charles Pasley, a prominent figure in military engineering at the time. In 1809, the year the East India Company opened its military seminary, Pasley expressed his trenchant views on the Royal Engineers Department, part of the Ordnance Corps at Woolwich. In his view, a complete re-structuring and re-organisation of the

[40] T. A. Heathcote, *The Royal Military Academy, Sandhurst: an Illustrated Guide to the Buildings and Grounds*, (Camberley, Surrey: The Royal Academy, Sandhurst, 1984), 1; Peter Lundgreen, "Engineering education in Europe and the USA, 1750–1930: The rise to dominance of school culture and the engineering professions," *Annals of Science* 47, no. 1 (1990): 33–75; Jonathan Hardwood, "Engineering Education between Science and Practice: Rethinking the Historiography," *History and Technology* 22, no. 1 (2006): 53–79; Robert A Buchanan, "The Rise of Scientific Engineering in Britain," *The British Journal for the History of Science* 18, no. 2 (1985): 218–33.
[41] Raugh, *The Victorians at War*, 5.

Department and its teaching methods was necessary in order to create a well-formed body of engineers with more practical experience; as he noted wryly, "as for practical instruction, they had none".[42] As a result of a wider campaign, the School of Military Engineering was founded three years later in Chatham, with Pasley as the head of the school. His influence as a reformer was evident in the introduction of stricter requirements for admission, extending the level and duration of prior practical experience in engineering. Candidates to the school were required to complete pre-commission training at Woolwich—an attempt to ensure that only the finest cadets were recruited. While reform was enacted through changes in the recruitment process, and in the structure of the course, the subjects covered in teaching were not radically different, with a focus on mathematics, drawing, surveying, and a European language remaining dominant. The practical component of the two-year course at Chatham consisted of a rigorous thirty-day pioneer training programme that included instruction on camp duties and rifle marksmanship. This step meant the School provided candidates with a more balanced teaching programme, integrating theoretical and practical components of training in military engineering. Another reform in cadet recruitment that Pasley initiated was the requirement that applicants should demonstrate proficiency in a specific trade (examples of which were eventually to include telegraphy, photography, lithography, and cartography).[43]

The emphasis at the School of Military Engineering on recruiting students with practical knowledge of visual technologies evidences the importance placed on visual representation in the engineering. Not only were photographs, lithographs, and maps

[42] B. R. Ward, *The School of Military Engineering 1812–1909* (Chatham: Royal Engineers Institute, 1909), 3. John Falconer's article is also helpful in contextualising the relationship between photography taught in military curricula. See: John Falconer, "Photography and the Royal Engineers," *Photographic Collector* 2, no.3 (Autumn 1981): 38.
[43] Raugh, *The Victorians at War*, 134.

seen as technical tools that allowed engineers to describe and disseminate visual information and knowledge, the role and identity of the engineer was defined, at least in part, in relation to his proficiency in techniques of visual representation. Furthermore, as noted in the brochure of the School of Military Engineering, it was important that an engineer could "sketch a landscape intelligently enough to illustrate a report".[44] The importance of visual representation in complementing textual description (a theme that will become important in later discussion of the Pearson albums) is here made clear. Photography itself was eventually introduced to the School as a stand-alone subject within the survey course in 1904.[45] Captain E. H. Hills, an assistant instructor in Chemistry who had long used survey photographs as a way of determining longitudes, considered the study of photography and lithography a benefit to the map production and surveying taught as part of the programme. It is interesting to note that, from 1868, the survey instruction lasted six months—a quarter of the duration of the entire course.[46]

The content of engineering curricula beyond the sphere of military engineering is harder to delineate for various reasons. First, unlike military engineers, civil engineers did not have the same level of formal instruction. Second, the professional route most civil engineers took revolved around apprenticeships or working their way up from junior positions in the drawing office of engineering companies. In considering the careers of Pearson's most senior engineers during the later nineteenth and early twentieth century— for example, Sir Ernest Moir and Sir Frederick Hopkinson—or indeed Weetman Pearson's own career, it is clear that professional pathways into the industry during this period often came through patronage in the form 'role inheritance' or

[44] Ward, *The School of Military Engineering*, 19.
[45] Ward, *The School of Military Engineering*, 35.
[46] Ward, *The School of Military Engineering*, 35.

apprenticeships.[47] The system of patronage in Victorian civil engineering was a path through which valuable professional and personal relationships between masters and pupils, and fathers and sons ushered in new generations of civil engineers.[48] Thirdly, as Chrimes suggests, there was an overall attitude of collaboration and co-operation between professionals on both sides of the discipline.[49] Even so, the relationship of co-operation between civil and military engineers was not always straightforward, especially in the case of railway construction in the1830s, when the government brought in military engineers in consulting capacities to advise and report on issues of safety and structures—an act that some civil engineers challenged as undermining their identity and independent standing.[50]

As demonstrated in this section, the role of the engineer and the identity of the engineering profession have evolved historically since the eighteenth century. What is clear is that engineers have had a longstanding familiarity with drawing and other practices of visual representation as means not only of putting technical and scientific knowledge into practise, but also of communicating their work to a variety of specialist and non-specialist audiences. Drawings, maps, lithographs, models, and photographs were used not only as tools to communicate concepts, ideas, and knowledge, but also as techniques of practice within the engineering profession itself, helping to define the role of the engineer. In the military engineering schools of the eighteenth and nineteenth centuries, the focus on geometry and landscape and military drawing exemplifies a wider conception of visual practice in the representation of natural and man-made

[47] Raymond Dumett ed. *Gentlemanly Capitalism and British Imperialism: The New Debate on Empire* (London: Longman 1999).
[48] Andersen, "Engineers in Imperial London," in *British Engineers*, 33–56.
[49] Chrimes, *Civil Engineering*, 36.
[50] Chrimes, *Civil Engineering*, 37.

phenomena as a set of skills to be learned and developed.[51] A strong understanding of the principles of geometry and sketching was also complementary skills in the making and interpretation of photographic imagery. As noted in Section 3.1, a thorough understanding of chemistry, a key subject taught in military engineering, was also an important factor in determining how engineers were able to engage with early photographic processes that relied heavily on chemical formulas necessary not only to sensitise paper and develop the image from the negative, but also to produce the photographic print.

3.3 Engineers and photographers: social and professional networks

Having demonstrated the salience of visual practices and technologies for the training of engineers, I will now explore another aspect of their relationship with the world of photography: that is, the social and professional networks through which engineers and photographers came into contact. In this section, I present examples of the types of social interactions and professional connections between engineers and photographers facilitated by learned societies and professional institutions. The Photographic Society of London and the Photographic Institute of London are two of the photographic networks I use as exemplary sites where these networks intersected.[52] As I will go on to

[51] This argument has parallels in the training provided to naval as well as military draughtsmen: see Felix Driver and Luciana Martins, "John Septimus Roe and the Art of Navigation, c.1815–1830," *History Workshop Journal* 54 (2002): 144–61.

[52] The Photographic Society of London received patronage from Queen Victoria and Prince Albert in 1853. Forty years later, in 1894, the society was renamed the Royal Photographic Society. See: Steve Edwards, "Societies, Groups, Institutions, and Exhibitions in the United Kingdom," in *Encyclopaedia of Nineteenth-Century Photography*, ed. John Hannavy (London: Routledge, 2008), 1303–7. Other examples of early photographic networks in Britain include: the Edinburgh Calotype Club (1841), the Leeds Photographic Society (1852), the Photographic Society Club (formed from the Photographic Society in 1853, the club promoted an informal space for the exchange of photographs between members), the Photographic Exchange Club (1853), the Architectural Photographic Association (1857), the Liverpool Exchange Club (1856) and the Amateur Photographic Association (1859). See, Carolyn Bloore, "Photographic Exchange Club and Photographic Society Club, London," in *Encyclopaedia of Nineteenth-century Photography*, ed. John Hannavy (London: Routledge, 2008), 1084.

show, membership of the Photographic Society of London included men and women from various professional and academic backgrounds. The society offered members frequent opportunities to participate in group outings and tours, submit photographic work for group exhibitions, exchange ideas, and improve photographic technical skills. In what follows, I will demonstrate how these types of social networks brought engineers and photographers together to explore business opportunities and commissions.

Formed in 1853, the origins of the Photographic Society can be traced to the Calotype Society, also known as the Photographic Club.[53] Founded in 1847 by Joseph Cundall and Robert Hunt, the Photographic Club consisted of a small gathering of gentlemen with a common interest in exploring the "art-science" of photography.[54] As Seiberling notes, the formation of the London-based photography club was merely a confirmation of what was a pre-existent social network of scientists, photographers and artists who shared common interests in the technical and aesthetic developments of photography.[55] However, the desire to establish a wide-ranging and structured community based upon the framework employed by other disciplines such as geography, civil engineering, and chemistry—each of which had, by the 1850s, established formal societies—gained momentum with various members of the Photographic Club. The members of the photographic club were also motivated by the relatively modest British presence in the photographic displays at the Great Exhibition of 1851. Of the seven hundred photographs exhibited, only twenty-two were by British photographers. A total of five

[53] Not to be confused with the Photographic Society Club, formed as part of the Photographic Society in 1853.
[54] Edwards, "Societies, Groups, Institutions," 1303.
[55] Grace Seiberling, *Amateurs, Photography, and the Mid-Victorian Imagination* (Chicago: University of Chicago Press, 1986), 8.

medal prizes were awarded to British photographers—a somewhat modest success in comparison to the twelve prizes awarded to the French photographers who exhibited.[56]

The purpose of the Photographic Club was, in this context, twofold: firstly, to expand its membership (and geographical range), and secondly, to develop the club into a society that actively promoted the exchange of photographic knowledge. However, members of the Club were concerned that the ongoing legal disputes relating to Talbot's patented calotype process posed an obstacle to wider dissemination and public engagement with the new medium.[57] The first substantial step taken towards the creation of a formal photography society took place in April 1852 when the "Proposal for the formation of a photographical society" was published in the *Art-Journal Advertiser*.[58] The opening paragraph of the proposal highlighted the substantial technical progression of photography in the thirteen years since its invention, noted the relative success in the reception of photographic materials exhibited at the Great Exhibition, and, more importantly, emphasised the increasingly international and collaborative scope of the medium as "its lovers and students in all parts of Europe were brought into more immediate and frequent communication".[59] The tone of the proposal was one of progress and connection, but also of stability. At its core, the proposal defined the future photographic society as a fixed place to facilitate the advancement of photography, where elected members, regardless of their social status or academic or professional background, were able to cultivate their passion for photography.

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[56] Taylor, *Impressed by Light*, 38.
[57] For more context on the calotype process, see note 8 in this chapter. William Henry Fox Talbot, the inventor of the paper negative process, also known as the calotype process (through which multiple positive photographic prints could be made from a single negative), patented his invention after a presentation of the photographic process at the Royal Society in 1841. Talbot's patent meant that photographers intending to use the calotype process in the production of photographs to be used commercially had to acquire a license from Talbot. Pressure from members of the Photographic Club, Lord Rosse (President of the Royal Society), and Sir Charles Eastlake (Director of the National Gallery) persuaded Talbot to gift his invention to the nation in July 1852. See: Taylor, *Impressed by light*, 45–51.
[58] Taylor, *Impressed by light*, 46.
[59] Taylor, *Impressed by light*, 46.

In December 1852, a month before the inaugural meeting of the Photographic Society of London, an exhibition of "Recent specimens of photography" was held at the Society of Arts. The location —in John Adam Street, off Victoria Embankment—was ideal for what was the first systematic survey of the scope and impact of photography in Britain and Europe after the Great Exhibition. Organised by Joseph Cundall and Philip Henry Delamotte, founding members of the Photographic Club, the initial number of prints exhibited was four hundred. However, this number rose to eight hundred with new additions and a reprint of the exhibition catalogue.[60] As Taylor notes, the quick turnaround of photographic entries submitted or borrowed, and entries later added to the exhibition, evidences some key points. Firstly, the success of the exhibition demonstrated the popularity of photography as an emerging discipline not only among networks of image makers and collectors, but also among audiences who visited the exhibition. Secondly, the substantial addition of photographs to the show denotes the flexibility in the circulation of photographs in pre-existing national and local networks of photography makers and consumers.[61]

The inaugural meeting of the Photographic Society of London was held on 20 January 1853. A fortnight later, Charles Blacker Vignoles (the celebrated British engineer, and later President of the Institution of Civil Engineers) spoke at the Society, underlying, as Alexander Gordon had done thirteen years before, the many of benefits of photography to an engineering profession engaged with projects that required long-distance management. At the meeting, Vignoles, a founding member of the Photographic Society, described how photography could:

[60] Taylor, *Impressed by light*, 50.
[61] Taylor, *Impressed by light*, 50.

> render engineers and others having to superintend important works which they could only occasionally visit, or having to make intelligible to foreign employers speaking a different language, with whom they could interchange ideas only imperfectly in conversation, the details of blocks and ropes, and complicated constructions.[62]

Photography was thus seen as being able to bridge long-distance communication and to improve project management, but also to transcend language barriers, aiding more efficient communication among engineers and employees. It is important to highlight the timing of Vignoles's speech, delivered soon after the construction of a suspension bridge in Kiev. In fact, Vignoles had commissioned John Cooke Bourne (whose prints depicting the railway from London to Birmingham had had such an impact on public perception of railway and steam technology) and Roger Fenton (a prominent photographer and member of the Photographic Society) to depict the progress of the works as the bridge was constructed—one of the first examples of collaboration between engineers and photographers, and one that had been facilitated by a common social network.

A complete survey of the relationship between engineers and photographers in Britain in the nineteenth and twentieth centuries is in itself an ambitious project. The purpose of this section, however, is to present an overview of how the two professions overlapped in relation to early social networks fostered by learned societies, and by the technical skills and technologies used to represent natural and man-made phenomena visually. In

[62] John Hannavy, "Photographic Markets," in *Encyclopedia of Nineteenth-Century Photography*, ed. John Hannavy (London: Routledge, 2013), 896.

this section, I have briefly covered how education was an important factor in ensuring teaching standards were met in military engineering academies. By ensuring aspiring military engineers were well-versed in topography, technical drawing, chemistry, and a foreign language, education was a structured pathway to engineering proficiency. Here, the role of visual representation through technical drawing, sketching, and photography can be used to map out the connections between both professions, not least from a formal educational perspective.

From a social point of view, the importance of Charles Vignoles' address to the Photographic Society and his role as a founding member of the society should not be overlooked. The fluidity of personal and professional connections through learned societies is equally important when thinking about the relationship between both professions. As Becky Simmons has noted, communication was an important aspect of photographic practice, and it was important that amateur photographers (in this sense, men and women who did not partake in photography for commercial purposes) were able to discuss practices, share ideas and exchange knowledge through societies and camera clubs.[63] The facilities presented by learned societies which often included a library and meeting spaces, offered fertile 'ground' for ideas, knowledge and professional contacts to be made. Group activities, such as talks and exhibitions, further pushed the circulation of ideas and skills promoted by these societies and clubs.[64] Technological advancements in camera equipment and photographic processes meant that by end of the nineteenth century a variety of photographic equipment and processes were available to mass audiences. Lighter cameras were easier to transport, and flash photography, for instance, allowed engineers to photograph underground or in poorly lit

[63] Becky Simmons, "Amateur Photographers, Camera Clubs, and Societies," in *Encyclopedia of Nineteenth-Ccentury Photography*, ed. John Hannavy (London: Routledge, 2013), 31–35.
[64] Simmons, "Amateur Photographers", 32.

conditions. Faster and more efficient photographic processes meant that photographs could be processed either using the photographic processes described previously, or, in the case of ready-to-use film rolls, exposed film could be sent to Kodak. Up until the 1870s, cameras were bulky and were manufactured from a standard sliding-box design wherein the lens was supported by a larger box and a smaller box at the back was used focus the lens and hold the plate negative.[65] From the 1870s to the late 1920s—the time period discussed in this thesis—camera design became increasingly varied and adaptable to a different type of consumer from the studio or commercial photographer: a consumer who required photographic equipment that was light and easy to carry and operate. Kodak recognised that need and offered the consumer photographic equipment that did not require extensive knowledge of the physical principles of photography or the chemistry underpinning the development of photographs to operate successfully.[66] In this respect, the turn of the twentieth century witnessed the democratisation of photography—it became a tool and a medium open to an increasingly wider audience of amateur operators.

Even without formal training through military academies, by the end of the century, engineers could take on the medium with relative confidence. Sir Frederick Hopkinson's personal photographic archive at the Institution of Civil Engineers is an example of this.[67] The lead Pearson engineer for the Sennar dam and irrigation works in

[65] Improvements on this fundamental design included, among other things, plate- holder flexibility to photograph landscape or portrait format, focusing scales, and a swing-and-tilt plate holder to help correct issues with perspective. See: Michael Pritchard, "Camera Development" in *the Oxford Companion to the Photograph*, ed. Robin Lenman (Oxford University Press, 2008).

[66] This is not to say that studio cameras were not used during this period. Rather, the photographic market from the 1880s onward became far more open and catered to both the studio photographer and the amateur.

[67] The Institution of Civil Engineers Library and Archives holds a small number of uncatalogued photographic prints belonging to Sir Frederick Hopkinson, taken during his time as Pearson's director in charge during the construction of the Sennar dam. The personal collection includes loose photographic prints likely to have been taken by Hopkinson, as well as prints taken by F. B., the commissioned photographer of the infrastructure. See: Uncatalogued, *Photographs of Sir Alfred Hopkinson*. These

Sudan (discussed in Chapter 6), Hopkinson sent regular updates on the works to the company's head office in London. Copies of the photographs sent to London to be included in the progress album on the infrastructure in Sudan, are part of Hopkinson's personal archive at the Institution (figure 3.4). The back of the folder which contains the prints shows that the film rolls were processed by a Kodak agent in Alexandria, Egypt.

Here, it is important to highlight once again the fluidity of the relationship between both professions.[68] The need to represent infrastructure and complex technical ideas visually is at the core of the relationship between photography and engineering. The ways in which this relationship evolved throughout the nineteenth century into the twentieth century reflected changes in technology, camera equipment, photographic processes, and the emergence of camera clubs and photographic societies, among other factors. Understanding the axis of this relationship is, in part, key to understanding the Pearson albums. The existence of these albums cannot be understood in a 'vacuum' as it were. Similar to the discussion (section 3.1) of the aesthetic conventions photographers 'inherited' from painters and water-colourists such as J.C. Bourne, that were applied in photography and photographic albums of infrastructure, understanding the ways in which engineers engaged with photography from its announcement in 1839 lays the path for understanding the very existence of the Pearson archive.

images provide further valuable insight into how engineers engaged with photography (as I will discuss in Chapter 6), and the currency and weight these non-commercial photographic prints held within the company's overarching visual culture.

[68] Here, Christopher Pinney's concept of 'parallel history'; where Pinney forays into the tangled histories of photography and anthropology is helpful to contextualise this section. See: Pinney, "The Doubled History of Photography and Anthropology," in *Photography and Anthropology*, 17–62.

3.4 The uses of photography in an industrial corporation, *c.* 1850–1930

The final section of this chapter provides an overview, using specific examples, of the uses of photography within a corporate context during the period under study. The main focus of the thesis—on the photographic album as a specific visual technology—is here situated in the wider context of the practical applications of photography in the business of a large-scale engineering corporation between c.1880 and 1930. This approach is intended to provide a basis for understanding Pearson's corporate stance towards photography as a means of surveying, communicating, and gathering evidence effectively and at a relative low cost.

On the basis of archival research, it is possible to identify three principal modes in which photography came to be used routinely within corporate practice during the period of study: photography used as evidence in disputes; photography used as a routine feature of internal and external reporting; and photography used for insurance purposes. The thread that brings these three categories together is the understanding of photography as a technology which was impartial in nature, and capable of producing material evidence in an objective and reliable form. As many historians of photography have noted, photography was constructed in a variety of disciplinary and specialist contexts as a reliable means of recording the 'objective' nature of real phenomena in a 'truthful' way.[69] This is evident in wide-ranging photographic archives and collections reflecting nineteenth- and twentieth-century academic pursuits in fields such as

[69] Here, the work of Jennifer Tucker, *Nature Exposed: Photography as Eyewitness in Victorian Science* (Baltimore: John Hopkins University Press, 2005); Kelley Wilder, *Photography and Science* (London: Reaktion, 2009); John Tagg, *The Burden of Representation: Essays on Photographies and Histories* (Basingstoke: Palgrave Macmillan, 1988); Joan M. Schwartz, "*The Geography Lesson*: Photographs and the Construction of Imaginative Geographies," *Journal of Historical Geography* 22 (1996): 16–45 is useful in understanding the construction of the 'objective' and 'indisputable' nature of photography in nineteenth-century disciplines.

geography, anthropology, ethnography, engineering, and science. The introduction of photographs in state identification, criminal records, hospital records, and the recruitment of personnel in the late-nineteenth century further evidences the role of photography as a fundamentally reliable and replicable technology.

In this sense, the engineers' approach to photography had much in common with that of scientists seeking to utilise photography as an observational technology intended to be as objective as possible. Yet, as I argue in the following chapter, the Pearson photographic albums performed additional, more distinct, functions within the company's corporate structure and professional networks. Moreover, as we shall discuss in this section, photography was also employed in other ways, for example as evidence in contract disputes between Pearson and the company's clients. An example of this type of use of photography to challenge a dispute can be found in Album P46, "Royal Albert Dock Extension: South (King George V dock)" (Figure 3.5). The album, contains 192 photographs depicting the construction of the East London dock extension between 1913 and 1915. The photographs show a chronological narrative of the construction of the dock, focusing on various technical aspects of the construction, the surrounding landscape, and views on the engineers' office. The various types of photographs included in the album, as reflected in the sizing of the prints and negative numbering in some of the images, suggests that this was the work of several hands, including perhaps a Pearson engineer, as well as a professional photographer. The engineer's contribution may be detected not only in the type of composition in the depiction of the subject matter of some of prints: a zoom into a shutter crane, or the framing of a foot walking into soft concrete, but also in the quality of the captions to these types of images.

Using the two images cited above as an example, it is clear that captions such as: "Shutter crane, rigid bearing which caused bending to axle; since improved" (figure 3.6) and "concrete deposited on March 4th which was still soft on March 7th" (figures 3.7 and 3.8), were photographs taken by a Pearson engineer as evidence of potential challenges to the working timelines agreed between Pearson and the contract client, the Port of London Authority. Further on in the same album, several pages highlight the use of photography as evidence in disputes. Six images, neatly arranged on the album page depict an empty work yard with raw materials, such as stone lined along the railway, and half-built walls indicating that work had been suspended (figure 3.9). The captions are thorough in describing the images, one reading: "Showing inner gate recesses at a standstill for want of 1 odd stones not yet arrived and in spite of stones lying and waiting which can then follow up. There will be next trouble in keeping our mixer going as these short lengths of work will remain only to complete the side walls." A note, written in pencil under each photograph on that page reads: "copy sent to Mr Palmer and Freemans" (figure 3.10). The Mr. Palmer referred to here was Sir Frederick Palmer, former Chief Engineer of the Port of Calcutta, appointed in 1909 as the Resident (i.e. Chief) Engineer of the Port of London Authority. The extensive captioning underneath the photograph, aligned with the way in which the construction site was photographed to convey a visual sense of stand-by strongly suggests that photographs were used in contexts of dispute between Pearson and its clients. Timely completion of the contract was crucial for any contractor to secure future work, and for Pearson in particular, which was known for its capacity to bid at very competitive values, completing a project on time was crucial to maintaining its external corporate image of efficiency and technical skill.

In addition to the use of photography as evidence in client-contractor disputes, photographs also came to be routinely used as part of internal and external written reports. Reports were a standard element of the engineering profession. As I highlighted in section 3.2, illustrating a report was one of the elementary tasks of engineering.[70] Various reports sent to Pearson's head office contained photographs illustrating technical aspects, which required visual aids to be fully interpreted by senior staff based in London. These documents included both internal reports compiled by Pearson engineers themselves, and reports from external consultants commissioned by Pearson to report on particular projects. These two types of written documents had much in common: both were created to summarise findings from engineering or geological surveys abroad, and reports usually featured one to two photographs per page, with the images serving to illustrate the survey work conducted by the company prior to infrastructure work. It is worth noting that the photographically illustrated reports in the collection refer to both branches of the Pearson conglomerate business interests as engineering contractors and oil exploration in Latin America.

These reports were a practical and inexpensive way to relay vital textual information and data, including photographs which permitted the reader to be able to see without being physically present. An example of this type of use of photograph is the 1915 report produced by the engineer Mr. C. Palmer as a case study for Lord Cowdray, Pearson's Director at the time. The eighteen-page report (Figure 3.11), entitled "Irrigation in Central Chile", featuring sixty-six photographs of the Chilean region of Valdivia, including its flora and geology, presenting the findings of a survey of the region conducted to assess the commercial potential of an irrigation system in central

[70] See note 44.

Chile.[71] A copy of the illustrated report was sent to the Chilean minister, although it is not evident from the supporting documentation in the collection to which Chilean governmental department the report was sent. Circulation was limited to Pearson and the client, both of whom had to be sufficiently informed on the viability of the project, including the geological make-up of the region and the potential for successful irrigation. Photography permitted senior members of staff and the Chilean government to have thorough insight into the strengths and limitations of the project without physically having to be present during the survey.

The function of these illustrated reports is comparable to that of the 'progress album', one of three album types discussed in Chapter 4. Moreover, both documents have similar material qualities in that they include both text and photographs, arranged in a simple format using relatively cheap materials: low quality paper in the case of reports, and off-the-shelf albums in the case of progress albums. However, while their functions were similar, there are also key differences, especially in the act of assemblage. As discussed in Chapter 4, progress albums were assembled in London by Pearson staff to convey a specific visual and linear narrative of the progress of construction—a valuable tool for effective long-distance project management. Reports on the other hand, were put together in country by a member of staff, or a consulting engineer, and then sent to London (and/ or the client) to be read. The purpose of the report was to convey the findings of surveys to attest to the viability of a specific project. In contrast, progress albums were assembled at a later stage of the project when work had already started and it was necessary for management to be updated on the progress of construction.

[71] PEA Box 48. "Chilean Irrigation Scheme".

A third, more specific, use to which photography was put within the context of the global engineering corporation was a function of bureaucratic practices associated with insurance. Arguably, the use of photography for insurance purposes was merely an extension of the use of photography as evidence in disputes, insofar as they share a common purpose: the provision of irrefutable evidence. However, it is important to distinguish between the use of photography to mediate disputes and the use of photography to claim insurance. In the case of Pearson, there are a few examples evidenced in the archives where photographs of an industrial plant were taken by a representative of Lloyd's of London. It is worth considering an example of this kind of usage of photography. In 1914, a representative of the company's insurers photographed a ravaging fire to one of the oil refineries. Pearson had several oil refineries in Mexico, which were funded directly by S. Pearson & Son's subsidiary company, Mexican Eagle. Mexican Eagle refined and exported various oil-based products, and unlike the contracting branch of the Pearson conglomerate, Mexican Eagle presented a higher financial risk, in that investment in Mexican oil exploration was funded entirely by the parent company.

Album P4-1, simply titled "Potrero", presents the viewer with various images of the firm's extensive oil refineries at that site in Mexico. Photographs of refinery interiors, exterior shots, equipment, and a blazing fire illustrate a different side of the Pearson conglomerate. In particular, the inclusion of photographs of a fire in one of the refineries is an unusual step in Pearson's relatively 'disaster free' photographic collection. In this album, the eight photographs taken by a member of Lloyd's depict the scale of the fire; dark clouds in the background engulf the surrounding landscape, presenting the viewer with a harrowing image of the destruction caused. A note written in ink below the photographs reads: "photographs taken of the fire at Potrero No 4 on

17th August 1914 by Lloyd's representative". In a similar vein, in using photographs as evidence, these types of images performed as visual, and by default, material representations of the truth, to be circulated among clients and the relevant legal and commercial specialists for examination.

This section has provided a brief introductory survey of some of the main uses of photography in the routine business practices of a global corporation. If other uses of photography (for example within records of staff employment or in the decoration of Pearson's head offices) have received less attention here, this is not because they are unimportant as themes, but rather because they are less easily evidenced in the company archives. The account of the functions of photography presented here focusses specifically on questions of business practice as they relate specifically to the management of large-scale infrastructural projects. It is in this context that the albums to be investigated in subsequent chapters find their significance.

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This chapter has considered the parallel and intersecting histories of engineering and photography over the period in which both activities became fully professionalised. Engineering, as we have seen, was already reliant on visual technologies – notably mapping and drawing – in the pre-photographic era. In this respect, the early adoption and constant use of photography from the 1840s demonstrates not only the significance of the technology in relation to 'virtual witnessing', but also the work done through the use and circulation of photographic albums. Alexander Gordon's paper presented to his peers at the Institution of Civil Engineers in 1840 heralded the benefits of photography as a relative inexpensive technology capable of reproducing images of buildings and

machinery. The photographic archive examined in the remainder of this thesis testifies to the fact, that within a few decades, speculative theory had become routine practice.

Chapter 4: Photographs as objects: the material archive

In Chapter 2 I discussed the prevalence of literature focused on family albums, produced in domestic spaces for a limited audience. Albums produced in corporate spaces such as the Pearson albums, require a different set of research questions and concerns. This chapter sets out to spend some time exploring the different types of photographic albums in the Pearson collection, paying close attention to their material qualities, functions, and audiences. Surveying the Pearson collection was a great endeavour in which I explored the company's visual records, part of an established tradition of corporate record keeping. As I addressed in Chapter 2, during the process of archival research, I sought to understand the rich material qualities present in the albums. This process of surveying, 'mapping', measuring, and note-taking resulted in a clearer awareness of the photographic collection: its functions, scale, assemblage and production.

In this chapter, I explore the three categories of albums that emerged from this process: presentational, portfolio and progress albums. The naming of categories has not been informed by documentation accompanying the collection; rather, it was suggested by recurring types of function(s) and audience(s) of the albums themselves. Presentational albums are a type of album produced to commemorate the construction of an infrastructure. They are produced externally to Pearson whose audience is external. This type of album presents the viewer with a high-end finish, and has a series of photographs illustrating the highlights of the construction of a particular infrastructure. Portfolio albums are similar in audience and material qualities (use of good quality commercially sourced photographs), however, they are produced internally to advertise Pearson's services as a global contractor to a wider audience. The third type of album analysed in this chapter, is the progress album. This type of album differs from the other

album types in that its audience is far more restricted in scope—usually limited to Pearson staff and the contract client—and the production of the album was done in-house as a collaborative effort among various members of company's personnel. This chapter is, therefore, divided into two broad sections: the first section outlines the general characteristics of the collection: its physical scale, organisation, and, storage format and in the second part, I explore the three types of albums. In addition to presenting some of the key findings on my research of the photographic collection, this chapter serves as a foundation to Chapters 5 and 6, in which I discuss the contexts of photographic production, circulation, and consumption more in-depth.

Working on aspects of the history of photographs in museum collections requires attention to the material qualities of photographic archives themselves.[1] The concept of photographs as material objects has received particular attention in Elizabeth Edwards and Janice Hart's argument that photographs can be engaged with intellectually as objects with particular material qualities and specific histories. This approach, regarding photographs as objects with distinct material characteristics, has informed my engagement with the Pearson collection.

During my first visit to see the Pearson collections (housed at the museum's large object store in Wroughton) in 2013, I was struck by the standardised appearance of the album binding in the photographic collection (see figure 1.1). During a subsequent visit to the archive, I asked John Underwood, the Librarian: "why are most of the album covers green or burgundy?" Standardised and uniform-looking photographic album covers were not characteristic of the albums I had researched in the past. My previous research

[1] For example: Edwards, Hart *Photographs Objects Histories*; Joan M. Schwartz, "Materiality"; Edwards and Morton, *Photographs Museums Collections*.

on personal and family albums meant my visual and material 'palette', as it were, was more attuned to the highly personalised albums and original album covers, not the serial and dual-tone qualities of the Pearson albums.

The answer to my question was simple. Correspondence in the early 1990s between the museum's head archivist and Pearson PLC revealed conservation concerns about the then original album covers, and, through a mutual agreement, a preventive conservation strategy to rebind all the albums that were in a state of deterioration was approved.[2] The rationale underpinning this plan was that no conservation action was likely to hinder future access to the photographic albums in the collection. Supported by Pearson PLC, the process of rebinding the covers and adding internal spine supports to the pages took two years to complete—an investment by Pearson that ensured continued access and active engagement with the albums.[3]

While the conservation process successfully safeguarded the material stability of the albums for the foreseeable future, the preventative measure of rebinding has, in a literal sense, removed a layer of the albums' material history that, arguably, would have been of fundamental interest to any researcher concerned with 1) how the Pearson albums functioned in their corporate environment, 2) their intended audiences, and 3) the modes of album production and assemblage employed by the firm. In approaching photographs as three-dimensional objects with distinct material, chemical, and physical characteristics, Edwards and Hart argue that photographs are simultaneously images and

[2] S. Pearson & Son accession file, Sc.L.G 171/821, Science Museum Library and Archives.
[3] Here Joan M. Schwartz's work on materiality and the photo-geographical archive is useful to contextualise some of the issues surrounding re-binding of photographical materials and institutional policies. Elizabeth Edwards and Christopher Morton's monograph is equally useful to contextualise wider challenges in relation to photographs and repository institutions. See Joan M. Schwartz, "Materiality and meaning in the photo-geographical archive" presented at the Royal Geographical Society as part of a workshop on geographical collections; Edwards and Morton, *Photographs, Museums, Collections*.

objects.[4] In employing this argument in my interpretation of the Pearson albums, I have drawn on an analytical framework that has been helpful to developing a richer understanding not only of how the albums functioned, but also how these albums might have been assembled and produced in the first place. My approach in surveying the collection has allowed me to identify the physical characteristics of the albums that can shed light on the various functions of the collection across its history. This approach had a dual focus. Firstly, I sought to understand the albums themselves: their forms, typologies, uses, and internal and external constituencies. Secondly, I applied this same material method to the prints *in* the albums, looking at size, quality, processes, and the annotations on the photographs that reveal the pre-album life of the photographs. At each stage, I sought to situate the albums and the collection within Pearson's wider business practices.

In a practical sense, employing a material approach to the collection was a process that entailed a thorough and systematic, six month-long physical survey of the 138 albums and their 12, 812 photographs, in order to document their key material qualities. For each album, I considered (among others): 1) the album cover (dimensions, text, materials), 2) the type and nature of captions, 3) marginal and other annotations, 4) the number of pages and photographs in the album, 5) photographic processes used, 6) the method of organisation in the album (chronological, geographic, thematic), 7) the time period covered by the album, 8) evidence of photographic and album authorship, 8) the album manufacturers, and 9) the geographical location of the infrastructure depicted in the album. The data collected from the six-month survey is stored in a spreadsheet which functions as a database.

[4] Edwards and Hart, *Photographs, Objects Histories*, 3.

Some of the material qualities I had set out to survey were not always available, in particular information on album manufacturers and photographers. The company's business archive, moreover, gave little indication of the costs associated with company photography and album production expenses. Lack of evidence as to the identity of the photographers commissioned by Pearson might reasonably be seen as a challenge, particularly to anyone interested in better understanding the role of the photographer, and their oeuvre, in this type of corporate environment. In the case of a corporate collection such as Pearson's, however, where the identity of the photographer was not considered sufficiently relevant to be subject to systematic record keeping by the company, a focus on materiality has allowed me to develop a broader view of the significance of the collection in relation to the firm's culture and operation. This thesis has, then, taken gaps in the archive as a prompt to ask slightly different questions about the nature and function of photography in a corporate environment, particularly as a tool of record keeping, knowledge exchange, and reputational development.

Likewise, aspects of Gillian Rose's methodology of visual analysis, emphasising technological, compositional, and social modes of interpretation has proved helpful in engaging with the Pearson albums.[5] Technological modes of production are explicit in the firm's photographically illustrated reports and albums; compositional modes (a key feature of Chapter 3) are present in the standardised 'ways of seeing' engineers and commercial photographers used in composing an image; and the social modes of meaning are visible in the various professional and social networks through which the photographic albums circulated and, later, in the different cultural institutions—such as

[5] Gillian Rose, "Towards a Critical Visual Methodology" in *Visual Methodologies: an Introduction to Researching with Visual Materials* (Los Angeles: SAGE, 216), 24–47.

a the Science Museum—that have photographic records of infrastructure in their collections.

While this thesis is focused on a collection with its own set of idiosyncrasies—and material characteristics specific to Pearson's corporate culture, record-keeping, and management style—a wider survey of photographic albums in the field of engineering, geology, and oil exploration (described more fully in Chapter 5), has revealed universal material and visual characteristics common across personal and presentational albums of infrastructure: simple and rigorous spatial organisation of photographs (often aided by pencil grid marks), medium to large-sized albums, visualisation of progress as a core theme and purpose, photographic documentation of fieldwork, among much else. The widespread use, and the uniformity in contents and style, of photographic albums of industry are evidence of the significance of photography in engineering and field sciences throughout the nineteenth and twentieth centuries.

The production of the Pearson albums was part of a wider culture of album-making in the engineering sector. Although there are material, thematic, and visual similarities between the Pearson albums and other albums of industry in other institutions, the particular way Pearson albums and business records are structured and accessed (the existence of the a company-produced finding aid, for instance) distinguishes this collection as a working tool of the corporation.[6] Comprising the bulk of the collection, the firm's business papers take up 80 archival boxes, each box containing a myriad of uncatalogued documents, diaries, contracts, reports, gifts, blueprints, and maps. The

[6] My tenure as a 2015 Arts and Humanities Research Council short term fellow at The Huntington Library in San Marino, California allowed me to research a photographic album collection of Ralph Arnold, a prominent American engineer and geologist, to draw comparisons between his personal photographic albums used as a tool and the Pearson collection. Other collections consulted include engineering photographic albums in the Institution of Civil Engineers in London.

finding aid which maps the business papers and the albums is, in itself, a fascinating object of study. Created by Pearson staff as a guide to the company's extensive records, a survey of the modern version of the finding aid opens a new perspective into structures, hierarchies, and modes of production of the collection.

The museum has kept Pearson's original material storage format and cataloguing system intact across the entire collection. The business papers continue to be stored in the original boxes and in the same order as they arrived at the museum: organised alphabetically in a nine-level hierarchical system (Table 1). The albums are organised numerically in two distinct sequences (Table 2).

Table 1. Hierarchical structure of the business papers in the Pearson collection

Number/ letter:	**Theme:**
Numerical	Civil engineering contracts
A	Correspondence
B	Utilities and other subsidiary companies
C	Oil prospects and interests
D	Mining
E	Mexican estates, land leases
F	Media, newspapers
G	*Data missing on G*
H	Aviation

Table 2. Sequence structure of the photographic albums in the Pearson collection

Sequence:	Number of albums:	Item level catalogue sequence:
P	1–79	P album number / print number
Q	1–59	Q album number / print number

Tables 1 and 2 demonstrate the different strategies employed by Pearson's staff in the structure and organisation of the business papers and albums. While a clear effort was made in archiving the papers thematically, by creating categories that reflected the range and scale of Pearson's multi-industry business empire, the photographic albums have no obvious organisational structure. The 138 albums are split in two alphabetical sequences: P and Q, each containing a series of numbered albums (1–79 in the case of P and 1–59 in the case of Q).[7] The P and Q sequences in which the albums are organised do not reveal any specific theme, subject, or chronological strategies. However, as a result of my material analysis of the albums, I have outlined the characteristics of 3 types of albums: progress, presentational, and portfolio. Each of these album types is defined by distinct material and visual qualities that reflect their sites of production, circulation, and consumption within Pearson and the firm's various professional and social networks. It is worth mentioning here that Pearson's archive was larger in volume in comparison to the number of photographic albums in the Pearson collection at the Science Museum. Correspondence between the museum and Pearson PLC in the early 1970s shows the museum's concern about missing albums. Pearson's secretary provides

[7] It is worth noting here that the number of photographic albums in the archive was far higher than what is visible in the collection at the museum. As I explore in Chapter 5, a handwritten pencil note alludes to album M60, a sequence letter not present in the finding-aid or in the collection. See Chapter 5, section 5.1.

some reassurance by saying that Pearson employees often consulted photographic albums, and that these may have not been returned.[8] Moreover, the finding aid index shows a few albums as "[NOS NOT IN USE]" which indicates the Pearson archive as one in some form of transformation, in that albums were consulted and not returned, and in some cases, albums were removed altogether. While there is no evidence of the timeline in which these changes happened, the idea that the collection was in fact much larger, is fascinating and thought-provoking. It also opens a line of inquiry on the company's archival management strategy: how did the company keep track of the albums, and more generally, what policies were followed that justified the removal of albums?

In what follows, I provide an in-depth visual and material analysis of a sample of each album type. Here, it is useful to refer to Appendices B, C, and D to see these album type samples in full.

4.1 Progress albums

Progress albums, as I categorise them, communicate linear construction progress through the use of photographs and text in the form of captions and annotations. This type of album comprises the bulk of the collection—130 albums of 138 in total—and it is clear through the overwhelming number of progress albums in the collection, that this corporate photographic archive (in its current iteration) had a very practical function: to monitor progress and ensure contracts ran and were completed on time. In addition to their main function to depict progress to senior management in London and the contract client, most of these albums have annotations written along the edges of album pages by

[8] S. Pearson & Son accession file, Sc.L.G 171/821, Science Museum Library and Archives.

different members of Pearson staff, denoting their secondary function as internal visual and material memoranda. In using photography in this way—to communicate internally, and to a select group of interested people—Pearson's senior management was able to manage various contracts centrally by proxy. In relation to the material qualities of the progress album, Table 3 is an overview of Album P3, "Mexico City and Mexican Depots".

Table 3. Description of the material qualities of Album P3, "Mexico City and Mexican Depots"

Material qualities:	
Cover size	18.5 × 15 inches
Page size	16 × 11.4 inches
Structure	Ranging from 1–5 prints per page
Authorship	Commercial photographers and Pearson engineers
Captions	Hand written, black ink – roman and italics
Annotations	Hand written, pencil
Number of photographs	67 prints – mounted on both sides
Visual narrative(s)	Infrastructure damage, political updates, updates on the destruction of a tank, office interiors
Audiences	For oil exploration albums, circulation was internal
Assemblage and production	Pearson staff: drawing department

Album P3, "Mexico City and Mexican Depots" (Appendix B), is an example of a progress album that had limited external circulation. In Chapter 5, I discuss a variant of a progress album series, which similar to Album P3, was produced in-house by staff in the drawing department; however, its circulation was expanded to the client. Here, it is

worth noting the slight difference in circulation between progress albums produced in the context of the company's own subsidiary Mexican Eagle (funded by S. Pearson & Son) and progress albums produced to be circulated within Pearson and to the clients. Album P3 is a good example of the range of this type of album. Thematically, the album can be divided in four broad oil exploration and refinement related themes: 1) assessment of the damage caused by the 1913 bombardment of Mexico City by revolutionary troops opposing President Madero, 2) company assets and holdings in the country, 3) fire damage to tanks and depots, and 4) survey of depot interiors. It is worth taking some time to look through the album. Layers of progress updates, corporate image, and information relay are present in the images selected from commercial photographers and Pearson engineers and in the quality of the captions and annotations. From the neatly hand written index, to P3/2 depicting a Mexican Eagle store front, to the ravaging fires depicted in P3/28–33 and the flooding of the Mexico City agency in P3/ 65–67, this album shows how photography was used as a technology at the core of the company's modes of communication.[9]

All of the characteristics outlined in Table 3 are consistent features of the majority of progress albums in the collection, evidencing the correlation between materiality and the different ways in which photographic objects function in social contexts.[10] In particular, the overall consistency in album dimensions is indicative of the company's preference for material and visual uniformity and continuity in the production of the firm's progress albums. What is not possible to ascertain, however, is the type or quality of album used for the purpose of depicting progress. As I shall describe in the next

[9] Here, Miles Ogborn's work on the role of print in the exchange of knowledge in the East India Company is relevant. Miles Ogborn, *Script and Print in the Making of the English East India Company* (Chicago, University of Chicago Press, 2007)

[10] It is worth noting that although the majority of progress albums in the collection have consistent measurements, a small number of albums do not conform in sizing. These smaller progress albums measure 10 × 12 inches and feature the burgundy re-bound covers.

section, the presentational album—at the other end of the material spectrum of Pearson albums—was a formal album made to order in larger quantities, in which, occasionally, a small sticker bearing the album manufacturer's information provides some indication of where and by whom presentational albums were produced. Album production and purchase dates or value data do not exist in the collection; the company's account books do not specify album purchases, and in the case of the progress albums, all of which have been rebound, it is difficult to get a clear sense of whether Pearson purchased standard, 'off the shelf' albums from a stationer's shop, or if these materials belonged to a more upmarket set of albums which could give a sense of Pearson's monetary investment in the production of progress albums.[11]

Taking Edwards and Hart's emphasis on materiality further, I examined how the current condition of the collection might provide evidence of its history and use. The brittleness of the edges of some of progress albums pages, for example, demonstrates substantial use and handling by (we might assume) senior management, employees, and researchers, both when the archive was under Pearson's care, and later, as part of the museum's collection. Equally, the need to re-bind the majority of the albums in the collections, points to heavy wear-and-tear which could have been due to a variety of factors, including heavy usage, and the conditions of the storage spaces in which the albums were kept. However, the storage conditions under which the collection was originally kept at Pearson's head office are unknown. Notes written on the archival boxes do suggest that it was kept in a safe room of some kind. Aside from showing heavy use, the material conditions of albums pages themselves provide evidence of the

[11] See: Langford, "The Albums as Collection," in *Suspended Conversations*, 41–63; Di Bello, "Nineteenth-Century Album Culture," in *Women's Albums,* 29–49; Siegel "Albums on the Market", *Galleries of Friendship and Fame,* 69–113; Rutherston, "Victorian Album Structures," *The Paper Conservator* 23 (1999), 13–25.

quality of the paper used in the albums and, in turn, the overall quality of the manufacturing process.

Jane Rutherston, head book conservator at the Victoria and Albert Museum, has noted that wood pulp-based paper—a popular choice in the mechanical production of paper in the nineteenth century—is prone to quicker degradation because of its short fibre length.[12] Furthermore, the difficulties of dating and identifying album manufacturers is presented in the Pearson albums, many of which were likely to have been produced and assembled during the First World War, where shortages and restrictions on goods meant Pearson was limited in its choice of albums. In April 2015, Rutherston visited the museum to see a sample of albums from the collection; her observations later provided fascinating insight and discussion on the material composition of these albums, and speculation on the source purchase of some of the albums. General points taken from this meeting include:

- The paper used for the presentational album (Admiralty Harbour, Dover—discussed in the next section) pages in the album sample Jane analysed was of high quality.
- The fact that the photographs and captions were glued to album pages suggests that few copies of this type of album were produced.
- Some of the progress albums in the sample were identified as early twentieth century albums.
- Some of the paper in the sample albums is deteriorating in part (possibly) due to extensive usage, but most likely to the poor quality of the paper
- The uniformity in handwritten and designed indexes is impressive, as is the quality of the calligraphy in some of the titles in the album pages (figure 5.2). I

[12] Rutherston, "Victorian Album Structures", 18.

> suspect the indexes and titles were designed and drawn by Pearson draughtsmen in the drawing department. Eric C. Nystrom's doctoral thesis on photography and underground mining in the USA touches upon the technical drawing skills engineers had, and the technical materials available in engineering offices to design complex structures.[13]

On the basis of Rutherston's work, and her analysis of a sample of albums, it is possible to suggest that the pages of the progress albums were manufactured from wood pulp—a type of material choice that suggests the majority of the albums in the collection were, most likely, originally from commercially available, mass-produced inexpensive albums. In a material sense, the affordable, 'off-the-shelf' progress albums are the product of an accelerated consumption of mass-produced products in the nineteenth century. However, it would be a disservice to these album types and their rich material qualities to describe these simply as standardised commodities. Paradoxically, once the photographs were organised and fixed to the pages, and the captions, indexes, and annotations written, these photographic albums transcended their commercial, mass-produced material nature to become hand-made, highly personalised objects, far from generic blank albums purchased at the stationer's shop. Thus, progress albums performed as photographic objects in constant material mutation, accruing layers of meaning and significance in the hands of staff as creators, and clients as viewers and consumers.

[13] Nystrom, *Learning to See*, 32.

4.2 Presentational albums

The second type of photographic album identified in the course of the initial survey of the collection is the presentational album. Distinct from the progress album in its material qualities and performance capacities, this type was typically presented by Pearson as the contractor to colleagues and the client as a gift to celebrate the successful completion of an infrastructure project. Because of its material qualities—minimal yet elegant gold-leaf-embossed covers and typeset captions—it is unlikely that the presentational album was produced in-house by Pearson staff in the drawing department as progress albums ordinarily were. The presentational album is also underrepresented in the Pearson collection; they number just two. These albums were prestige items, presenting viewers with a clear visual narrative of 'cherry-picked' photographs of an infrastructure project, taken by a commissioned commercial photographer under the direction of the client's resident engineer, and communicating a message of orderly progress. Table 4 summarises the main material qualities of one such album—Q7 "Admiralty Harbour, Dover" (reproduced as Appendix C).

Table 4. Description of the material qualities of Album Q7 "Admiralty Harbour, Dover"

Material qualities:	
Cover size	13 × 8.5 inches
Page size	12.5 × 8 inches
Structure	One print per page, flyleaf/end papers, title page, index, pages have a plate-mark but do not have page numbers
Authorship	Photographs taken by a commercial photographer
Captions	Mechanical

Annotations	No annotations
Number of photographs	8 photographic prints, 1 map, and 1 lithograph, each mounted one side only
Visual narrative(s)	Depicting key elements of construction progress
Audience(s)	Pearson staff (internal), clients, and professional affiliations (external)
Assemblage and production	Unknown, but likely to be professionally assembled and produced

Album Q7 presents a succinct narrative depicting the construction of the Admiralty Harbour in Dover between 1902 and 1909. The album is typified by the use of high-quality materials—from the thickness of paper stock, to the impressive formality of navy leather-bound and gold-leaf-embossed cover. The construction of the harbour is presented to the viewer in a way that is simple to navigate. Whilst the album's literal focus is on the construction of a maritime infrastructure project, its thematic focus is on Pearson's construction skills and aptitude. The scale of the construction of the harbour is captured by the photographer(s) who, through various viewpoints, shows the viewer the magnitude and impact of this infrastructure on the surrounding landscape. Along with photographs, a map, and contextual preface (providing a narrative of progress and ingenuity), this frames Pearson as a contractor whose experience and expertise can be trusted with the successful delivery of such complex projects.

A compliment slip on the first page of Album Q7 denotes its function as an object designed to be gifted—something to be examined at leisure not as a repository of technical knowledge and information but as a record of an engineering vision successfully realised. In this respect, it is important, here, to spend some time on the

representational strategies employed by the photographer to frame the harbour and its surrounding landscape. Looking through the eight photographic prints in the album, it is clear that the photographer, who was likely to have been working under the visual direction of the resident engineer, was instructed to capture the full scale of the works. Focusing not only on the harbour and the surrounding landscape in the background, including the iconic White Cliffs of Dover, but also on intermediate stages of construction, the viewer is 'transported' through space and time to the construction site, witnessing at first-hand the harbour's construction progress and invited to marvel at the scale and ambition of the project.

A cohesive narrative of construction progress and technological prowess is presented through consistency in the photographic framing of the construction site and the surrounding landscape, while uniformity in graphic style and content of captions emphasises the minimalist nature of these albums. Presentational albums were produced with photographic images taken as a result of contractual agreements between Pearson and the client that stipulated that photographs of the construction were to be taken for the duration of the project. Arguably, the photographs in the presentational albums were shaped by the commercial relationship between the resident engineer and the photographer commissioned to depict views of construction progress and the completed infrastructure. As I will explore in Chapter 5, the power relationship between the resident engineer and the photographer was not equal. Working under the visual direction of the engineer (usually a client employee, or hired by the client to oversee the construction), the commercial photographer was contractually bound to photograph views taken from specific locations directed by the resident engineer.

A few of Pearson's contractual agreements with the British Government—the company's main client—stipulated that the firm was responsible for commissioning a commercial photographer (including the full cost of hiring the photographer) to work on-site whilst producing a body of photographic work representing the various stages of construction for the duration of the contract. When analysed closely, in the context described above, there is tension in the very nature of photographic production in this type of album. On one hand, the images are the result of the photographer's interpretation of directions from the resident engineer. On the other hand, Pearson, as the contractor, had the financial burden to pay the photographer's wage, including the associated material costs necessary to produce a significant body of work over the duration of the project on-site as the photographer followed the progress of construction. Moreover, Pearson had a vested interest in the end result of these images as these photographs had the potential to document and represent visually the firm's technical and commercial capacities and scope as a global contractor.

Once photographs were taken, printed, processed, and distributed to Pearson staff and client representatives, the presentational album was produced by selecting photographs that best represented different stages of the infrastructure, including of other visual materials—such as technical diagrams representing section cuts of the infrastructure or maps of the area—intended to enrich the album's visual narrative. Occasionally, a group portrait of client representatives, key members of Pearson staff involved in the construction, and the resident engineer and his staff was included in the first pages of the album. An introductory textual section comprising two to three pages served to contextualise the project, politically and financially. A brief section detailing the contractor and the resident engineer, followed by technical data and statistics related to the construction, provided the backdrop necessary to interpret the photographs in the

album. Overall, the visual and textual narrative in a presentational album was one that placed Pearson and the client in the most positive possible light.

The material qualities outlined in Table 4 detail the extensive curatorial effort required to mediate commercial and professional interests when assembling the presentational album to ensure it conveyed a sense of achievement represented by the completion of a major engineering project. The Pearson archive does not, however, provide evidence of the logistics underpinning the production and potential distribution of presentational albums. It is unclear from the firm's account books who bore the financial burden of producing albums of this calibre, nor are there clues as to how the visual narrative for the presentational album was selected, edited, and captioned, and by whom this task was completed. Equally, the small sample size in the collection can only allow for informed speculation on the circulation a presentational album would have had, how many of each album would have been produced, and the basis upon which recipients of the album were decided. What I can say is that, in light of the themes in the Pearson presentational albums, these are photographic objects materially and visually charged with political, commercial, and technological motivations, displaying powerful narratives of imperialism, technological prowess, capitalism, and progress. The political, commercial, and technological motivations are embedded in the presentational album's function as a tool used to communicate images of industrial and technological progress, underlined by political imperatives. Imperial undertones are also present in the very composition of the photographs included in the Admiralty Harbour album with the inclusion of the surrounding landscape and cliffs of Dover as symbols of British and,

more specifically, English identity.[14]

4.3 Portfolio albums

The final category in the collection is the portfolio album (Appendix D). Materially speaking, this type of album sits between the informal, 'work-in-progress' album and the formal, 'gift-type' albums analysed previously. In the same way the progress albums were re-bound to stop further deterioration, the portfolio albums in the collection have been re-bound with the same type of cover, physically removing a layer of the albums' material history, effectively making it difficult to assess or speculate as to the type, quality, and monetary value of the albums used for the purpose of advertising Pearson's contracting services. The portfolio album typically displayed, in a sophisticated way, a sampling of photographs of Pearson's contracts, presenting and reinforcing the company's view of itself as a successful global contractor.[15] While the presentational and portfolio albums share common characteristics—primary appeal to external audiences, produced externally to Pearson, sophisticated spatial arrangement of images and text—there are other material and production characteristics that differentiate them. First, the visual narrative in the portfolio albums reads clearly as a 'best of' approach, designed to illustrate some of Pearson's most prestigious domestic and international contracts. Unlike the 'monotone' narrative display of a single contract in the presentational album, the portfolio album contains a sub-series of narratives, visually

[14] Paul Readman, *Storied Ground: Landscape and the Shaping of English National Identity* (Cambridge: Cambridge University Press, 2018).
[15] Text-only booklet versions of the portfolio albums were published in English, Spanish, French, and Arabic, to reflect the firm's presence in Northern Africa, Europe, and Latin America. These booklets listed the company's contracts by region, and the portfolio albums are a result of the company's sensibility to the geographical range of its market and audiences. See, PEA Box 50, 'Lists of contracts carried out'.

guiding the reader through Pearson's history of excellence as a contractor. The commercial nature of this type of album sets it apart from the presentational album, in that the former was created to project a targeted corporate image of the contractor. In contrast, as I highlighted previously, the presentational album was created with the potential to be gifted, and shared among clients.

In contrast to the production process of the presentational album, the editorial decisions made in relation to spatial arrangements and visual narrative(s) in the portfolio albums were not the result of a collaborative effort between institutions and clients. Selecting photographs from the company's growing archive, with the intention to include images in the portfolio albums, meant Pearson was actively involved with its photographic archive—on the one hand, revisiting its recent corporate history whilst, on the other hand, weighing and selecting images that effectively portrayed a message that corresponded with the company's wider commercial strategies of self-promotion. In a similar vein, the portfolio album solely represented Pearson's image under the spotlight of technical proficiency, expertise, and accomplishments, not concerned with a narrative of collective success comprising external investors, clients and affiliate institutions present in the presentational albums. As I have presented in the previous categories, the table below summarises some of the material characteristics I have outlined above:

Table 5: Description of the material qualities of Album Q40, 'Miscellaneous Pearson Works'

Material qualities:	
Cover size	13 × 10 inches
Page size	11.5 × 9 inches
Structure	One print per page
Type of photographs	Photographs taken by commercial photographers
Captions	Mechanical, glued on the page
Annotations	No annotations, prints have negative numbers and labels
Number of photographs	78
Visual narrative(s)	Various sub-narratives, displaying major contracts and company holdings
Audience(s)	Current clients, prospective clients, professional affiliations
Assemblage and production	Unknown, likely to be professionally assembled and produced under the supervision of Pearson

Album Q40 (Appendix D) is a fascinating example of a portfolio album. As I will show in Chapter 5, this type of album reads as an industrial catalogue, showing viewers the company's most successful contracts, and assets. Of particular interest in Album Q40 is the inclusion of photographs of Lord Cowdray, the company director, and the firm's head office in London—promoting an image of professionalism and prestige. Therefore, the portfolio album encompasses various editorial, thematic, material, and commercial concerns that set it apart from the presentational album—functioning as a high-end commercial catalogue of Pearson's recent accomplishments. Photography, hand-in-hand with halftone reproductions, enabled corporations like Pearson to market services

visually, and on a mass scale, to domestic and foreign audiences.[16] While the Pearson portfolio albums were not created with mass-market audiences in mind—the nature of Pearson's business as a contractor meant its target audience was mainly local authorities, governments, and financial institutions—the portfolio album nonetheless was part of a wider integration of the uses of photography in industrial markets.

Applying materiality as a way of engaging with the photographic collection has produced important observations on the nature of the collection, but also in the *types* of albums comprising the company's visual archive. While this chapter has focused on outlining and exploring the different types of albums in the collection—their material qualities, themes, functions, audiences and hypotheses on their assemblage and production—there are yet a few glaring themes which have not been addressed. Firstly, failure as a theme, either through technical issues, environmental conditions, or through accidents is virtually non-existent in all three album categories. A few progress albums visually refer to failure in the form of photographs of Mexican Eagle, Pearson's Mexican oil subsidiary warehouse fires, or delays to construction due to poor weather conditions. However, as a whole, failure as such, is seldom depicted in the albums. It is very unlikely that in the company's engineering career zero human or technical accidents happened; however, these visual records of these accidents were not added to the visual narratives in the albums in the collection. Whether the omission of photographs depicting disasters or accidents was deliberate or not, the absence of this type of photograph is clear in what it states to an external audience: Pearson was a reliable and confident engineering company. Here, Philip Hatfield's doctoral thesis is useful to contextualise the use of photography in the representation of collisions and

[16] Nye, *Image Worlds*, 114.

accidents in the railways in Canada.[17] Hatfield asserts that photography was used as a tool that mediated the concept of railways and modernity; railway was seen as a beacon of progress and human triumph, but equally, photographs of rail collisions and accidents, showed how railways could also be unsafe to humans.[18]

Secondly, there is a lack of visual representation of the diversity of workers who were responsible for building the infrastructures Pearson managed. While workers are often photographed from afar, their bodies involuntarily used for scale to demonstrate the impressive size of the construction sites these men worked on, there is very little engagement with the workers themselves. Not much is known on how Pearson secured foreign labour in their various international contracts. Furthermore, not much is also known about the working conditions provided to construction staff by Pearson. Photographs of purpose-built accommodation for engineers occurs in the albums, providing a viewer with an idea of the living and working conditions of engineers, draughtsmen, and management. Other types of photographic engagement with employees, such as group staff photographs, are equally not common throughout. A few photographs of the company's staff are featured in a handful of albums; however, there aren't many images of groups of staff whose gaze looks directly at the camera.

Thirdly—and perhaps as a point which altogether summarises the purpose of this collection—the portfolio albums were a unilateral effort to depict a specific corporate image both to internal and external audiences. I suggest that this corporate image was one that was highly curated and fine-tuned to craft a corporate image of excellence, global reach, technical prowess, influence, and progress. It is likely that photographs

[17] See: Hatfield, "Colonial Copyright", 119–28.
[18] Hatfield, "Colonial Copyright", 120.

depicting accidents and groups of workers, or offering a visual insight into the working conditions of the many people who were hired by Pearson existed. However, those types did not fit the image Pearson management was so interested in crafting and maintaining. Unlike Lewis Hine's extensive documentary photographic oeuvre depicting the working conditions and child labour of North American factories, the Pearson albums were metaphorically 'crafted' from a corporate fabric which consisted of a positive corporate image.

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This Chapter builds upon the extensive hand-on research conducted on the Pearson collection. It should be seen as a foundation to the following two chapters, in which I shall explore and discuss the points made here in more detail. It is relevant to reiterate here how I approached the collection, focussing on material aspects of the vast collection of photographic albums. In doing so, I was able to determine how the different albums in the archive communicated to different internal and external constituencies. These functions of communication will be explored the following Chapters.

Chapter 5: Internal communications: albums as working documents

This chapter is concerned with the use of photographic albums within the Pearson organisation, understood in the wider context of its infrastructures of communication and project management. In Chapter 3, I discussed the different ways in which engineers were exposed to, and engaged with, photography in the second half of the nineteenth century and the first part of the twentieth. In this chapter, I explore how photography was applied to support the long-distance project management of Pearson's contracts, at both national and international scales. This focus requires some contextualisation through an examination of the company's visual and communication infrastructures. The first section of the chapter, therefore, situates these infrastructures in relation to the types of visual and written materials used to communicate within and beyond the company, and the types of individuals and institutions involved in producing and consuming those materials (section 4.1).

The second section of this chapter develops the argument that the type of photographic album with which I am principally concerned here—that depicting the visual and chronological progress of a contract, or updates related to an international subsidiary company—can best be understood as a working document, a visual and material object designed to be subjected to ongoing editing and re-editing by the firm's draughtsmen and managers (section 4.2). The role and wider significance of this type of album, as a working document in a state of material flux within a wider system of communication, provides the core theme of the chapter. In this respect, the discussion presented here departs from a common approach to (often domestic) photographic albums in which they are conceived as dormant objects of memory, waiting to be activated as gateways to a lost past. Instead, the working album needs to be situated within the context of corporate administration, a visual tool reflecting the dynamics of project management and communication. The number of progress albums is significantly higher than that of

portfolio albums or presentational albums (130 progress albums, 2 presentational albums and 6 portfolio albums). In this second section, I analyse one example in particular—Album P13 "Coatzacoalcos, Salina Cruz 1903–1909"—that visually depicts six years of construction of various types of maritime projects, including harbours, docks, port works, dredging, breakwaters, and wharves in the Mexican cities of Coatzacoalcos and Salina Cruz.

The third section of this chapter provides an in-depth case study of a series of working albums, developing the general argument about the use of photography as an effective project management tool and as a means of performing internal communication in a specific context (section 4.3). This case study is based on a series of seven albums depicting the construction of an armaments factory at Gretna during the First World War. The factory, built to supply the British armed forces with cordite, the explosive ingredient required to produce ammunition, took three years to complete and at £9,184.000, turned out to be Pearson's most profitable contract.[1] This section provides a detailed survey, highlighting the types of visual narrative employed in their production, the material qualities of the albums and the photographs they contain, and ideas concerning the potential use(s) of the albums. The Gretna album series provides a clear example of the dynamic role that photographic albums of this type played in corporate contexts, where the efficient sharing of information within and between institutions was of vital importance.

[1] Robert Middlemas, *The Master Builders*, 289.

5.1 Photographic albums and internal corporate communications

In a general sense, photography participated in the communications revolution of the nineteenth century, and needs to be seen—in this wider context—as one technology amongst others (including railway, steamships, the telegraph, and the postal system) that transformed the ways in which space was experienced and managed.[2] This fact applies as much to corporate communications as it does to more individual or interpersonal uses of photography (such as the postcard) that have often been discussed.[3] The movement of photographic images across national and international boundaries is evidently an integral feature of the Pearson collection, containing as it does thousands of photographic images made in various parts of the world where the company operated as a contractor, and then archived within albums housed at its London headquarters. However, in the historical study of technologies of communication employed within transnational organisations, including corporations and empires, the role of visual documentation in general, and photography in particular, has received far less attention than that of script or print, for example.[4] Like many global corporations, Pearson employed a variety of visual and written media to communicate different types of knowledge to different constituencies within and beyond the company.

As outlined in Chapter 1, the Pearson collection consists of written documents, in print and manuscript form, accounting for approximately three-quarters of the collection. Comprising eighty archival boxes, these written documents correspond to external

[2] See, for example, Natale, "Photography and Communication Media in the Nineteenth Century"; Schwartz and Ryan, eds, *Picturing Place*; Poole, *Vision Race and Modernity*.
[3] Elizabeth Edwards, "Postcards—Greetings from Another World," in *The Tourist Image: Myths and Myth Making in Tourism*, edited by Tom Selwyn (Chichester: Wiley, 1996), 197–221.
[4] Natale, "Photography and Communication Media"; Ogborn, *Indian Ink.*

correspondence, i.e., letters to and from subsidiary parts of the corporation and external organisations beyond its headquarters in Westminster. Apart from correspondence, the collection also includes business contracts from the company's business portfolios between 1860 and 1930, various legal documents (including office leases and paperwork drawn up for tenders), internal financial reports, account books, staff memoranda, and technical and scientific reports written by consulting engineers and Pearson staff for senior management. The diversity of written documents in the collection demonstrates the complexity of the internal and external communication infrastructures that enabled Pearson to operate as a contractor. At the same time, these sources provide evidence concerning the various constituencies with which Pearson engaged on a routine basis: national and international clients, solicitors, local and international consulting engineers, and various members of its own staff, including accountants, secretaries, draughtsmen, and senior management. The alphabetical arrangement of these heterogeneous business records covering a wide range of operations (civil engineering, oil, mining, utilities, and media), filed by country or by business portfolio, also illustrates the global scope of Pearson's undertakings, which, by 1930, included Angola, Canada, and China, to Iraq, Mexico, and Spain.

The visual materials within the Pearson collection, accounting for around a quarter of the total number of documents, consist of maps and plans, corporate organograms describing relationships with and within the multiple subsidiaries of S. Pearson & Son, 138 photographic albums, scattered loose photographic prints (often duplicates of prints in the albums), one film reel depicting a railway opening ceremony in Mexico, blueprints of diagrams bound in book form, and a sample of opening ceremony invitations. A variety of communities within the organisation engaged with these visual materials alongside printed texts, illustrated reports, and correspondence. However, a

key difference in the case of the photographic albums and invitations to public events stems from their wider circulation beyond the realms of internal administration, as is evidenced by the number of copies of albums in various national and international repositories.[5]

Though different in many respects and requiring different levels of skill in reading, and with different potential for public consumption (depending on the format), together, textual and visual materials enabled Pearson to coordinate and manage its various business portfolios and communications from its headquarter offices in Westminster. Managing relationships with clients located well beyond London, many of them overseas, required efficiency, clarity, and a common knowledge base from which all parties could work. In the case of visual materials, such as diagrams or photographs, this knowledge base would have include a common visual language facilitating communication and knowledge making. As I noted in Chapter 3, almost from the inception of photography, engineers viewed the medium as an efficient technology through which images of engineering works, at various stages of completion, could be 'faithfully' reproduced. By the late-nineteenth century, with the development of more accessible and cheaper means of making and reproducing photographs, the camera had become widely available as a means of documenting landscapes and buildings, and photographic training was part of the toolkit of modern engineering practice.[6] Large corporations such as Pearson relied on photography as an integral part of their business practice, a "central management tool" enabling the efficient management of their operations across large distances.[7] While Elizabeth Edwards has argued in the case of the historic buildings survey movement of the period, that the "promise of photographs

[5] Copies of Pearson albums have been located in a variety of repositories, including at the Fine Art Library, Harvard University, the Institution of Civil Engineers, London, The National Archives, Kew, Durham University, the University of California, Santa Barbara, and the British Library. See bibliography for details.
[6] Seiberling, *Amateurs, Photography*, 91–105.
[7] Brown, *The Corporate Eye*, 138.

was to grasp time and rematerialise it", one might suggest that the promise of photography in the context of a global engineering corporation such as Pearson was to grasp *space* and rematerialise it.[8]

Photographs were made and circulated amongst specialist communities including draughtsmen, engineers, and managers within the Pearson Corporation as part of the routine management of contracts—the images treated as evidence of various stages of the work. Some of the albums, such as the portfolio and presentational albums discussed in Chapter 6, were disseminated well beyond the company, reaching other audiences to whom the photographs would have conveyed rather different meanings[9]. However, in the case of the progress albums discussed here, whose circulation was typically limited to Pearson employees and the contract client, the network of circulation was narrower and the visual content far more technical in both composition and subject matter. This fact is evident in the types of photographs selected for these albums, suggesting an overriding concern with the visual representation of specific technical data from specific vantage points, and their description in the form of technical captions. With site-specific knowledge presented in this form, engineers, managers, and clients could exchange information at a distance by proxy, the photograph itself being a key element in what Bruno Latour has called "cycles of accumulation" in the production of knowledge.[10] As in other contexts, photography's indexical quality of 'realism' readily enabled its incorporation within the infrastructure of commercial communication and management, facilitating the creation and circulation of knowledge among various constituencies.

[8] Elizabeth Edwards, *The Camera as Historian: Amateur Photographers and Historical Imagination, 1885–1918* (Durham, NC: Duke University Press, 2012), 7.
[9] See note 5 in this chapter.
[10] Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987), 219.

5.2 Albums as working documents

In order to demonstrate the essential properties of the progress album as a working document, it is useful to begin with an example. Album P13 "Coatzacoalcos, Salina Cruz 1903–1909" depicts seven years of construction of various types of maritime works including harbours, docks, port works, dredging, breakwaters, and wharves in the Mexican cities of Coatzacoalcos and Salina Cruz, situated on the Mexican Gulf and the Pacific coast, respectively. These two cities were also the terminal ports of the transcontinental rail line connecting the Mexican coasts at its narrowest point, the Isthmus of Tehuantepec. The rail line, built by Pearson between 1899 and 1906, was itself a major contract in the firm's Mexican business portfolio. Associated with the railway contract, were two other contracts awarded to Pearson which supported the goal behind the project of moving goods and people quickly and efficiently between the two coasts of the country. These contracts mainly involved the building of new harbours to accommodate the import and export of goods and materials. Work on extensive maritime infrastructure at Coatzacoalcos, facing the Mexican gulf, began in 1896 and took seven years to finish. Construction in Salina Cruz, on the Pacific terminus of the rail line, took roughly the same amount of time to finish, having begun a few years later in 1899. The contracts for the Tehuantepec line and its associated maritime infrastructure were important assets in Pearson's business affairs in Mexico. Having cultivated a favourable relationship with Porfirio Díaz, the Mexican President, the company was able to secure a financial stake in the maintenance and running of the rail line.[11] Given the scale and high-profile character of these contracts, efficient management and communication of these projects, extending across a wide geographical area, was a key priority for the company.

[11] Garner, *British Lions*, 94–137.

Album P13 features fifty photographs of the construction of infrastructure in Coatzacoalcos and Salina Cruz, spread over thirty-nine pages and bound in a green cover measuring 19 × 12 inches. The photographs in the album are arranged into two parts, one for each port, and within each part they are presented chronologically. The first page of the album presents the viewer with an unfinished index (figures 5.1 and 5.2). Written in black ink, with a pencil grid drawn to frame the index contents, the capitalised words "INDEX TO COATZACOALCOS" appear, followed by "and Salina Cruz" in pencil. An arrow drawn in pencil pointing from the second half of the title "Salina Cruz" to the second half of the index below provides an initial indication of the unfinished nature of this album. The phrase "Album No", written in ink below the title, further underlines the provisional nature of the record of work-in-progress in this album. The content of the index, with page number, title of the photograph, and the date the image was taken, is to the left, and spaced harmoniously on the page. On the right of the page is an empty pencil grid with "page" at the head of the empty right-hand column, a clear indication of an intent to add more photographs to the album, and another example of the working methods employed by the draughtsmen who put the albums together.

P13 contains photographs in a variety of formats, ranging from folded multiple-plate panorama photographs, to medium-sized prints, indicating the diverse nature of the imagery sourced for this album from a number of commercial photographers including Eden von Düben and R. A. Mumm.[12] While the overarching narrative of the album is chronological, the progress of the work is not depicted through a steady survey of its stages of development (as in the Gretna albums analysed in section 4.3). Instead, the

[12] In this case, the photographer's stamp on the print is useful to begin to have an idea of the range of commercial photographers Pearson recruited to visually depict their works.

viewer is offered general views of unfinished works, construction yards, and workers photographed sitting on the metal beams of an unfinished wharf in Coatzacoalcos, and rows of dredgers framed by the coastal landscape that is awaiting its own impending transformation. In the present context, however, the main focus of attention is on the annotations in this album, specifically the various pencil markings and notes left for colleagues on the album pages, and what they tell us about the uses to which such albums were put.

The twelfth page of Album P13 (Figures 5.3 and 5.4) features two photographs evenly placed below the title, "COATZACOALCOS", drawn in ink on the page. The top photograph, P13/21, taken in October 1908, is captioned "Port works, office and River Coatzacoalcos". It depicts what it is likely to be the contractor's staff office near the port, the port construction work yard, a building opposite the office, and the river in the background. The foreground gives enough context to see that the photographer, R. A. Mumm (whose name "Mumm Photo" is present in the print), took the image from under a tree. From a technical perspective, the image presents a few issues: overexposure of the background makes it difficult for the viewer to understand the surrounding landscape and the foliage from the photographer's placement under the tree distracts from the subject matter. A smudge of blue ink on the upper left-hand corner of the print possibly indicates the hasty nature of stamping and processing incoming photographs. By the standards of contemporary landscape art photography, in which context this photograph would not be described as successful in aesthetic terms (at least), other photographs taken by commercial photographers in the Pearson collection are more evenly balanced in relation to image exposure values. This particular image's significance lies in the practical use and function within the company's communications systems that ensured its placement within a progress album, as a working document.

A succinct pencil note left on the right side of the print draws attention to the internal circulation of these albums within the Pearson corporate structure. It reads: "there is a better photo in album M60".[13] This anonymous trace of internal company communication, requires some unpacking. Firstly, it indicates a definite sense of purpose: assuming the annotation is contemporaneous with the project, such a comment suggests knowledge of the relative merits of different images intended as a record of the progress of the works. Secondly, it implies a process of internal communication insofar as it is a comment by one member of staff intended for another, a routine annotation of the kind made on correspondence or other documents relating to the management of the company, or indeed any large organisation in the period. And, finally, the note implies a division of labour of some sort in the editorial process of the putting the albums together. Less evident in other types of albums which are, by definition, more polished or 'finished', such annotations are a characteristic feature of albums designed to function as working documents, providing evidence of the kinds of conversations and exchanges involved in the creation of a record.

A different type of note from another member of staff with different handwriting can be found on page thirty in the second half of the album dedicated to the Salina Cruz contract. The single photograph, P13/41, taken in October 1908 and placed in the centre of the page, has a short caption which reads "Lift Bridges" (figures 5.5 and 5.6). In this case, the photographer has composed the image in a way which places the two bridges at the centre. The bridges in the mid-ground frame the view of the ongoing, unfinished state of construction. Bodies of water in the foreground and background of the image

[13] M60 is an album that does not exist in the current iteration of the Pearson archive. This pencil note adds valuable insight into the wider archive as it existed at Pearson's head office. As I referred to in Chapter 1, and Chapter 4, when the archive was transferred to the museum, its archival structure remained intact, however, as the Keeper of Engineering noted, a few albums were missing.

visually contextualise the maritime purpose of the engineering work. A note on the right of image P13/41 reads “there is a later photo (Feb 09) which is marked to be kept”. This annotation offers evidence of another aspect of the process of creating and managing albums as working documents. For whatever reason, a memorandum from one employee to another has registered the need for attention to be paid to a photograph of the same subject matter taken three months later. While we have no evidence of their comparative merits, as we do for the previous example, this example further indicates that these albums were the product and focus of a shared process of judgement.

Further inferences can be made from the specific media in which album annotations were made. Writing in pencil is often associated with provisionality. Unlike the permanent stain of ink, pencil markings and notes can be smudged, erased, and, with time, may eventually fade. In this context, the use of pencil as a medium to write comments, leave instructions, or make remarks to colleagues evokes a sense that these albums were not regarded as a permanent, inviolable record, but as works in progress. The lack of identifying initials in such cases—a characteristic feature of civil service memoranda in this period, for example—might reasonably suggest a certain degree of familiarity between the members of the Pearson staff responsible for making such albums, giving further insight into the logistics of album production in the company. While relatively little evidence survives of the precise arrangements through which the albums were commissioned and managed, it is most likely to have been employees in Pearson’s drawing department who were responsible for the design and assemblage of the albums. The basis for this argument is twofold. On the one hand, draughtsmen had the technical skill to visually arrange and design the space on the album page; on the other, they had access to drawing materials and the physical space necessary to assemble and design albums. In the specific context of mining engineering during this

period, Nystrom describes drawing offices as purpose-built spaces where draughtsmen had access to the latest technology allowing them to produce various types of visual materials required for mine management.[14] Furthermore, the neat pencil-marked columns structure of the index in P13 (discussed above) indicates a level of precision, and attention to detail, consistent with the style and standards of work which engineering draughtsmen were typically expected to create. As the department responsible for the creation and storage of topographical drawings, blueprints, technical sketches, diagrams and maps, it would be logical that draughtsmen would be given responsibility for the design and management of these working albums.[15]

In this section, progress albums have been presented as a particular type of photographic assemblage, designed for purposes of internal communication alongside other written and visual materials, including memoranda, correspondence, telegraphy, and printed reports. By the late nineteenth century, photography in this form played a major role in the ways in which projects were managed, visualised, and understood by Pearson staff. The study of these albums—their material form, their arrangement, and their annotation—thus provides significant insight into the process of communication and management within the company. The preceding discussion of annotation, in particular, has drawn attention to the role of the progress album series as an *active* tool of corporate management, in the sense that it provides clear evidence that members of the Pearson staff actively engaged with the photographs, accruing further knowledge in the process. My emphasis on the provisional and developing nature of this particular series of albums further challenges the notion that photographic albums are static portals to the

[14] Nystrom, *Seeing Underground*, 26.
[15] The way photographs were incorporated into pre-existing systems of archives and record management during the period covered by this thesis is a larger topic worthy of further research, see: Edwards and Morton, *Photographs Museums, Collections*. In some cases, ad hoc solutions were found, with photographs interspersed within archival or print collections, but not otherwise catalogued; in others, photographs might be acquired and managed in the same way as books and maps, for example.

past.[16] These albums were tools of management of large-scale enterprises undertaken at a distance, and rather like the projects they were designed to document, they were works in progress.

5.3 Case study: the Gretna album series

The general points made above about Pearson's communication infrastructure, progress albums as working documents, and the material qualities of progress albums may be demonstrated through an in-depth study of a series of albums produced in the course of Pearson operations at Gretna in 1916. The following case study is arranged in four parts. The first part contextualises the history of the contract depicted in the albums, involving the construction of a cordite production complex that included housing for workers and its own transport system, and outlines the wider political context in which the albums were produced and through which they circulated. The second part provides a material and visual survey of the seven albums in the series, exploring the key messages of progress, stability, and confidence presented through the composition, selection, arrangement, and annotation of the photographs they contain. The third part provides a specific example of one of the albums that contains a series of images of the progress of construction at regular intervals in 1916. The fourth and final part considers the penultimate album in the series which takes a more synoptic view of the landscape, setting, and sites within the factory complex as it operated between 1916 and 1918.

[16] Langford, *Suspended Conversations*, 64–65.

5.3.1 Context

His Majesty's Factory, Gretna was a cordite production facility built between 1915 and 1918. At that time, it was the largest of its kind ever built in the United Kingdom. The seven surviving progress albums documenting the construction of the factory all bear the title "Gretna" and run in two album parts from P74 to Q1. Commissioned by the newly created Ministry of Munitions, the central government department responsible for the production of armaments and the associated organisation of labour, the building of the Gretna factory was a direct response to the so-called 'Shell Crisis' of 1915. This was a widely publicised episode in First World War military planning. Press publicity surrounding a shortage of high-explosive artillery shells in the British army led to a political crisis for which the government sought an urgent solution to the problem in order to increase the supply of cordite to the British forces in Europe.[17] The Shell Crisis, however, involved more than a shortage of munitions available to troops on the front line; it encompassed widespread political, managerial, and military concerns relating to Britain's wartime productive capacity. Under the leadership of the Liberal Party politician David Lloyd George, the Ministry of Munitions oversaw the construction of various cordite production facilities with the aim of radically expanding the mass-production of artillery.

Built at Gretna on the English-Scottish border, the new factory complex stretched over a distance of twelve miles and consisted of four separate cordite production facilities, living quarters for twenty-thousand workers, advanced chemical laboratories, an

[17] See, for example, Ralph Adams, "Delivering the Goods, Reappraising the Ministry of Munitions 1915–1916," *Albion* 7 (1975): 232–44; Michael Pattison, "Scientists, Inventors and the Military in Britain 1915–19: The Munitions Inventions Department," *Social Studies of Science* 17 (1983): 521–68; Peter Fraser, "The British 'Shells Scandal' of 1915," *Canadian Journal of History* 18 (1983): 69–86; Denys Hay, "The Official History of the Ministry of Munitions," *The Economy History Society Review* 14 (1944): 185–90.

integrated rail transport system, and independent water and power supplies.[18] While credit for the award of the contract has usually been given to Lord Cowdray as "the best-known and most experienced industrial organizer in this complicated field", rather less attention has been paid to the importance of his political connections with Lloyd George, the minister for munitions.[19] By 1915 Cowdray was undoubtedly a well-acclaimed international contractor with several high-profile contracts not only to construction, but also to the day-to-day running of the transport infrastructure it built, in the company's business portfolio, including the Mexican Canal in Mexico City, the Tehuantepec transcontinental rail line, the Admiralty Harbour in Dover, and several maritime infrastructure in Malta, to name but a few. Alongside his business career, Cowdray was also active in Liberal politics, initially as a Member of Parliament in 1895, and subsequently being elevated to the House of Lords in 1917. Lloyd George, for his part, was Chancellor of the Exchequer in the Liberal government at the outbreak of war, becoming Minister of Munitions in the wake of the Shell Crisis, a role that lasted for just over a year between May 1915 and July 1916.[20] In this context, as a large engineering company with headquarters near the seat of government power in Westminster, the company was undoubtedly well-placed to undertake the Gretna contract; and Lord Cowdray's political, as well as commercial connections, would undoubtedly have helped in securing the contract. More generally, as Andersen has noted, the development of British engineering during this period cannot be understood independently of the social, political, and financial networks of leading engineers.[21] In the case of the Gretna factories, once Pearson had been commissioned to undertake the works, the spatiality of these networks—especially those connecting government

[18] PEA Box 14, Science Museum Library & Archives.
[19] Middlemas, "Weetman Pearson, Lord Cowdray," in *The Master Builders*, 232.
[20] Previous to his appointment as minister of munitions, Lloyd George served as President of the Board of Trade and Chancellor of the Exchequer. See, Frank Owen, *Tempestuous Journey: Lloyd George, His Life and Times* (London: Hutchinson, 1953).
[21] Andersen, *British Engineers*, 41.

ministries with the Pearson offices in Westminster—would take on a new significance. Given the pressure the Ministry of Munitions was under to resolve the shell crisis, efficient management of the Gretna project was clearly a high priority. In this context, effective communication between Pearson and the authorities in Whitehall was key. The albums associated with the contract were one of the material means by which information about the progress of the works circulated.

5.3.2 The Gretna album series: material and visual analysis

The seven albums produced for the Gretna contract document, in considerable detail, the construction and running of the cordite factory, the adjoining facilities, and associated transport infrastructure. The albums in the Pearson collection were chronologically catalogued from 1915 to 1918, with each album covering periods of three to four months. As a whole, the series documents not only the progress of construction, but also some of the routine aspects of the operation of the factory, including working and living conditions of the large labour force. From close inspection of the albums themselves, it is possible to discern the traces of key editorial policies, design decisions, and visual strategies in their material form: chronological visual narratives, hand-written captions and annotations, presentational regularities, and hand-sketched diagrams drawing attention to key details and dates. These overarching common features create a persuasive thematic and visual unity throughout the series as a whole.

The first four albums, numbered P74 to P77, invite the viewer to witness the linear construction of a large-scale cordite factory over four sites from 1915 to 1916. The photographs, organised in chronological sequence, were taken from various vantage

points, providing the viewer with the most expansive and comprehensive view of the construction yards, and a tremendous sense of the scale of logistics and manpower that went into building the factory. By contrast, the remaining three albums, P78–Q1, provide the viewer with photographs framed indoors, and to a smaller scale, offering perspectives on the different facets of factory and community life, including interior shots of factory spaces and workers, the living facilities for workers and their families, and the transport and logistics of factory management.

The broad themes of progress, stability, and confidence are consistently represented throughout the Gretna albums series. Given the nature of the contract and the client, it is perhaps unsurprising these themes feature so heavily. In order to visually represent a variety of visual strategies were adopted by the photographer and album editor(s) as reflected in photographs of the same subject matter captured at fortnightly intervals, as a way of evidencing the progress of construction: photographs of well-lit open-plan factory interiors taken near a window; portraits of workers actively engaging in their duties (usually oblivious to the presence of the camera); avoidance of evidence of accidents or injuries typical of munitions factories, indicating that everything was going according to plan; and ample views of the surrounding landscape to give the viewer a sense of scale and accomplishment.

In total there are 736 photographs of identical size in the seven Gretna albums. The dimensions of the album covers are all identical, but the number of pages per album ranges between 31 and 66. Black ink is used consistently throughout in the making of titles, captions, and indexes, and pencil is used throughout in annotations and draft captions. Other consistent features include the regular sizing of prints and the arrangement of two prints per page on a double-spread setting. The subject matter of the

photographs within the albums varies from everyday scenes to panoramic views taken from vantage points giving the viewer a full range of vision over the landscape. Construction progress is often depicted through exterior shots, often in the form of two to three photographs of the same location at regular intervals over a three to four month period to allow the viewer to witness the progress of construction visually, with written captions adding detailed contextual information concerning date and location. Interior shots predominate in the second half of the series, which includes images of workers in the factories and in their homes.

Many of these characteristics are included in the example in Album 75, figures 5.7 and 5.8. These present an image of the progress of construction from the first half of the series. Comprising five photographs placed continously, the page provides the viewer with a series of views taken from one of the heater change houses. The caption ("Site II General View from Heater Change House at South End of Units 3 & 4.- April 11 1916") situates the viewer temporally and spatially on the construction site. A key characteristic of the work in progress albums is the use of hand-drawn annotations on the prints which allows the viewer to be spatially situated within the photographically represented space. P75/241 depicts a view of Site II overlooking, on the left of the print, an open landscape untouched by the construction work developing on the right of the print. A series of pipes, possibly connecting the heater change house from where the photograph was taken to the other heater change house in Site II, serve as an informal division of the visual arrangement in the photograph. To the right of the pipes the viewer is met with quite a heavily populated construction scene; a large amount of rubble adjacent to interlacing rail lines visually leads the viewer's eye to key infrastructure, as highlighted by ink arrows. In this print the album compiler is interested in ensuring the viewer is aware of the highlighted infrastructure (clockwise):

heater change house, boxing (1 and 2), and unit 3 houses. By employing hand-drawn graphics, the album compiler allows the viewer to discern exactly what the compiler wants to highlight. In the case of P75/241, it was important to ensure the viewer knew the key infrastructure that was visually represented.

Figure 5.9 provides a striking example of a photograph from the second half of the series depicting the operation of the factory and associated facilities. From a visual point of view, the photographs in this part of the series differ significantly in content and compositional strategies from the type of photograph described in the first half. However, from a formal perspective, there is clear intent in how the subject matter is framed—as is suggested by the strategy of placing workers close to natural sources of light, and the use of two-point perspective to enhance the repetition of geometric shapes formed by the rigid alignment of machinery which spatially situates the viewer in the industrial workspace. Taken at the Mossband facility, the photograph depicts two uniformed female workers weighing ether and alcohol. The two women are not photographed looking at the camera, instead they are depicted as concentrating on performing the task at hand, seemingly unaware of the presence of the camera and the photographer. Their backs face the wide window in the background, the top part of which is open, a sign of good ventilation and working conditions for these women. The workers funnel the organic compounds from three large metal containers bearing the words “ether” and “alcohol” (printed in black upper-case type) through to smaller canisters which sit on the scales while the workers measure their volume. The adjacent workbench is filled with metal canisters, neatly arranged and waiting to be filled or ready to be moved along to the next relevant working area.

P79/60 reflects a preference for the use of careful composition, paying attention to natural light sources, ensuring the subject matter is static, in full engagement with its industrial surroundings. In contrast with the previous example, these photographic prints (like others in this type of album) are not accompanied by captions written on the pages of the album. Instead, they are numbered and dated on the prints themselves—captions that carry details of site and date, as well as their individual negative numbers. These images of functioning production sites themselves contain evidence of the coordinates of their own production.

5.3.3 The Gretna Works in Progress, 1916: Album P75

Album P75, the second volume in the Gretna series, covers a four-month construction period between January and May 1916. The thirty-five-page green-bound album contains 136 photographs organised chronologically, displaying two medium-sized prints per page over 31 pages. The overarching theme of P75 is progress in the construction of factory infrastructure. In particular, this album provides a series of visual snapshots of the construction of various facilities within the factory complex including workshops, the boiler house, power house, drying plant, ether plant, and the nitric acid house. The surrounding landscape is occasionally shown in the photographs of facilities and infrastructure thanks to the position of the photographer, who ensured that expansive surrounding spaces were included in the frame. This is relevant to photographs of infrastructure taken from vantage points which allow the viewer to have an ample view on the infrastructure and the factory complex in the same frame. Engaging with these albums from a production perspective, it is clear that the authors of the album series were aware of how the series was to be read as a *narrative*. This fact is evident in the continuous flow of the visual narrative despite the lack of indexes at the

start of each album—a feature of the progress album in this collection. However, the visual narrative woven through the seven albums is also structured by the numerical transition between the photographic prints. For instance, the last two prints from P74 are labelled as No 122 and 123, and P75 picks up the narrative starting with prints No 126 and 127, demonstrating not only the chronological nature of the series, but also the systematisation of the photographs and a clear process of numbering, arranging, and placing the prints in albums.

Image No 126 (figure 5.10 and 5.11), the top photograph in P75, is dated 30 January 1916, and its caption, hand-written in black ink on the print, reads "Site III Looking N at Building 6A 30.01.16 No 126". The body of the caption, written on the print, is neatly distributed across the width of the image, providing the viewer with much-needed information about the photograph: location of the subject matter, date, and the number of the photograph within the wider album series. This attention to detail is consistent throughout the series and indeed throughout the rest of the albums in the collection. On the right-hand side of the image, another piece of written information helps situate the viewer: "General Offices, Dorrock" is written in black ink in different hand-writing to the caption above. Below this secondary text, there is an arrow pointing to a two-storey building, likely Pearson's site office in the background of the image.

Two buildings in different stages of construction, one of which is building 6A, can be seen in the middle-ground of the image. At this stage of the construction, building 6A is depicted at a very early stage—the structural frame of the infrastructure is clearly visible, and to the right of the buildings debris and smoke reinforce the work in progress atmosphere on the construction site. The foreground of the image reveals track marks that carve an imaginary divide between the building under construction and the debris.

Various other track marks in the foreground further reinforce the transportation of materials being brought to and from this site.

The photographic print numbered 126 is accompanied by an annotation—"Previous 91"—which is the only text written outside its frame. In the context of this album series, this third piece of written information works as a linking device between the image and the temporality of its production. A viewer with access to the whole series, who looks for image 91 in P74, will find an image of the same construction site, taken a month before. Indeed, image 91 (figure 5.12 and 5.13) is taken from a similar angle, and features an identical caption to 126: "Site III Looking North at Building 6A Dec 29 1915 No 91"; and, on the right of the image, "Previous No 67" and "Forward No 126" situate the photograph in the wider, chronological sequence of the Gretna album series. Following the navigational key offered by the caption, image 67 in the same album features a photograph of the same construction site, looking in the same direction as that taken two weeks before on 15 December 1915. The outer caption here reads: "previous no 52" and "forward no 91". Going back, image 52 of the same building was taken a week before, and image 37 was taken in November.[22]

There are two key observations to make here. Firstly, the various sets of hand-written notes, keys, and captions throughout the albums is evidence of the production of this series as a collective departmental project, rather than the sole work of an individual member of staff. This ongoing co-operation between members of staff adds a further dimension to the conceptualisation of this type of album as a working document, in that different members of staff would have had access to and input into the album

[22] Timeline of site III, building 6A in albums P74 and P75: P74, image 23, is missing; P74, image 37, November 29 1915; P74, image 52, December 8 1915; P74, image 67, December 15 1915; P75, image 91, December 29 1915.

production process. The sequential visual relay of the construction of building 6A on site III in the space of three albums within the series is a good example of the operational foresight and effort set in place to design, structure, organise, and caption the photographs in the Gretna album series in order to produce a cohesive chronological, visual narrative of steady construction progress and effective project management. The ability to demonstrate the progress of the work visually was one of the fundamental aspects of Pearson's corporate strategy designed to prove its worth as field leader in a highly competitive business environment.

Secondly, the consistent and systematic nature of the labelling and captioning of prints throughout the Gretna series demonstrates an adherence to an underlying design supportive of the overall visual narrative. This structure did not simply reflect the personal taste of the individuals responsible for captioning the prints in the albums. Instead, members of staff responsible for the production of the albums ensured the visual and material integrity of the series by maintaining a standardised approach to production throughout the album series. This design is simple, yet effective in its purpose to support a streamlined, chronological visual narrative in the albums. In practical terms, the scheme comprised a single caption placed immediately above the print indicating the geographical location at which the photograph was taken, a description of the site, the name of the building, the direction in which the viewer is looking, and the date and the number of the print. Additional information added to the prints can be seen in the form of shorter captions with arrows pointing to a specific part of the subject matter in order to draw the viewer's attention to important information not included in the caption. The annotationon the album page, to the right of the photograph, serves a functional purpose as a 'navigational key', a term I have referred to throughout my analysis of the photographs of building 6A, demonstrating how the

viewer was guided to ‘move’ in space and time through different phases of the construction of a specific building or infrastructure.

Album P75 provides a good example of the progress album as a working document, produced in multiple copies, to be shared and edited by various members of the Pearson company staff and the British Government as its client. Four copies of the Gretna albums (and around two hundred loose prints) sent to the Ministry of Munitions’ office are currently in the custody of The National Archives at Kew. Part of the Ministry of Munitions papers, MUN 5/297 parts 1–4 correspond to duplicate albums mirroring the Gretna albums in the company’s collection. On a primary level, it is important to acknowledge a few things. Firstly, the existence of four copies of the Gretna albums as part of Government records demonstrates the ways photography was used to make it simple to communicate at short or long distances between companies and clients. Secondly, the existence of copies of these albums shows the collaborative nature of album circulation within the company’s networks. The existence of duplicate albums at The National Archives also demonstrates the labour that went into producing albums on this scale of circulation, as at least two copies of each album were produced; one for Pearson, and one for the client. Thirdly, the Ministry of Munitions’ copies still have their original binding, which—as I observed in Chapter 4—is critical for understanding the role photographic albums played in the company’s internal and external communications. Scholars such as Elizabeth Edwards, Janice Hart, and Joan M. Schwartz have argued that photographic meaning is the sum of various factors including the very material qualities of a photograph. Therefore, the album copies at The National Archives present a rich source of material evidence which, as a result of the conservation work undertaken by the Science Museum, is otherwise absent from the Pearson albums themselves. The cover of MUN 5/297 part 1 (figure 5.14) shows, for

example, the extensive wear along the edges of the cover, and there is significant damage to the spine. The album cover is simple in its decoration, suggesting a pre-manufactured purchase, rather than a custom-made album. However, the three stickers on the cover add an interesting dimension to understanding the practical functions of progress albums. The first sticker reads "Gretna no 2" and shows where this album sits within the seven Gretna albums. The second sticker has had part of the paper ripped, but the word "URGENT" remains legible. Below the title, the Ministry of Munitions' archive registry address on Southwark Bridge Road, London indicates where the album was sent at some point. It remains unclear whether this sticker was added during the period when the albums were in active use, or were sent to the Ministry of Munitions' archive at a later date. The second album in The National Archives series, MUN 5/297 part 2 (figure 5.15), likewise presents rich material evidence of how photographic albums depicting progress were engaged with by a client. Similarly, as with the previous album (albeit presenting different material qualities), this album seems to be a commercially available album; the word "photographs", embossed in gold in cursive type, further evidence that the album was mass-produced. If we 'ignore' The National Archives' own material traces, which identify the album within its own archival hierarchy, we are left with three stickers. The note at the lower right, implies the album was addressed to a Mr Gilmour, who was likely Pearson's contact at the Ministry's office in Whitehall. This brief 'detour' into The National Archives Gretna album copies is useful for a few reasons: seeing photographic albums that have retained their original features, as it were, contributes to some of the wider points I have made in the thesis thus far. For example, based on the material qualities of the Pearson album copies in The National Archives, it is likely that Pearson used mass-marketed albums to record and monitor progress. Therefore, it is worth paying attention to the material qualities these types of photographic objects presents, and the histories that are told through the

layers of materiality. In the context of the Gretna case study here, it is paramount to be able to engage with both sets of albums to have an understanding of the types of corporate mechanisms set in place to ensure clients were regularly updated on construction progress.

The ongoing nature of the production of the albums alongside the construction of the various sites that comprised the factory complex is an interesting way of looking at album production in professional contexts. As a working document in the company's corporate archive, made available to company staff and presumably also to government officials, the Pearson albums of Gretna are active documents with ongoing uses. Their makers were committed ultimately to demonstrating the utility of their operations to the war effort, not simply to recording them for posterity: in this sense, this type of album defies Martha Langford's assertion that "all compilers appeal in some way to the future".[23] Beyond the generic sense in which this is true of all photography, this argument applies particularly to albums created for the purposes of memorial or heritage, whether of family or community, including many of those in the Pearson collection which are the focus of Chapter 6. But it is much less useful in the case of the progress albums discussed in this chapter, were created to respond to the needs of the present. In this context, the purpose of the progress album was to ensure that company personnel and the client had a clear view of the progress of construction across its various stages. As the example of Album P75 shows, the simplicity of the design allowed any member of staff to navigate through the series and to gain a comprehensive understanding of the current status of the factory construction at any given time. This kind of photographic album was designed as an effective tool of project management,

[23] Langford, *Suspended Conversations*, 64.

evidencing the company's record of progress and enabling the remote management of complex and strategic contracts, such as that at Gretna.

5.3.4 Picturing Gretna, 1916–1918: Album P79

P79 is the penultimate album in the Gretna series. Comprising 116 photographs across sixty pages, this album departs somewhat from the visual narrative of the preceding albums, with their regular fortnightly updates, in that it provides an overview of the factory site over a two-year period. The overview style of this album is visible in the five maps with which it opens, a feature it shares with the presentational albums discussed in Chapter 6. Nonetheless, Album P79 displays many of the features which define the progress album: unfinished captions and notes, diagrams and in-print captions, chronological arrangement of the photographic prints, photographs taken from vantage points presenting the viewer with numerous views of the factory complex and its surrounding landscape, and annotations in various hands, demonstrating the collaborative nature of the album-production process.

This album also presents the viewer with some attributes that are new in the Gretna series, namely: inclusion of maps, panoramic photographic prints, and a wider range of subject matter within a single album. Compared to the preceding albums, P79 offers the viewer a much richer mixture of external shots of the landscape and infrastructure, interior shots of the factory complex, the workers' housing and leisure spaces, and images of everyday life in the factory over a two-year period. Moreover, the progress of construction at Gretna is not measured within the same systematised timeframe as in the previous albums in the series. While sharing the overarching narrative of the Gretna series—the visual depiction of the various stages of the construction of the factory and

its later active use—Album P79 offers, instead, an overview of the project, providing a more synoptic view of the themes displayed in the five preceding albums.

The first page of the album, entitled "Volume no 6 General Photographs", introduces the viewer to the general nature of its photographic content, although the fact that the title is written in pencil perhaps registers the provisional status of the album. The first page is followed by five maps of various sizes. Enclosed now in transparent archival sleeves, the maps give the viewer a wider visual sense of the scale of the various sites and key information to what was, by then, a very large factory complex, with pedestrian, vehicle, and train routes throughout the compound. Maps 1, 4, and 5 offer a visual guide to the various transport routes within site III of the factory complex, while maps 2 and 3 display two townships which housed factory workers: Gretna and Eastriggs (figure 5.16). For the first time in the Gretna album series, maps and photographs cohabit the same album space. This is a significant consideration in an album that functions as a working document, linking different visual media. In this album, maps function as wider navigational keys that geographically situate and contextualise the 112 photographs in a two-dimensional setting.

In what follows, I will perform an in-depth material and visual analysis of two photographs from Album P79. The images have been selected on the basis that they are exemplars of themes present not only in Album P79 in particular, but in other work in progress albums in the collection. The first image is P79/12: "694 A to F Bird's-eye view from Cresol Plant, Mossband" (figure 5.17). The image, a 6-part panoramic photograph of the Mossband site, offers an expansive view over the site encompassing the surrounding landscape, workers' housing, and livestock. The choice of the panoramic format to depict the Mossband facility is not unusual given the use of

panoramic photographs throughout the collection. While not a common choice in the Gretna album series itself, panoramas are featured heavily in the Malta album series, for instance. The use of panoramic prints in this context offers further insights into the logistics of the process of album production. Section E of panorama number 12 in Album P79 has a series of textual annotations written in pencil that shed light on the thought process behind the assemblage of the photographic albums. The back of the print reads: "GRETNA - BIRDS EYE VIEW FROM CRESOL PLANT. Negatives No 694 {ABCDEF} Mossband. ARCH PEAR P79 GRETNA VOL 6". The text exemplifies much of what has been discussed in this chapter: the unfinished appearance of what was a working document, its status as a work in progress, and the evidence of ongoing collaborative work on this type of album. The nature of Album P79 as a working document is yet more apparent in the second part of the text, where the compiler references the company's archival cataloguing system: Arch Pear P (album series letter) followed by the album number. As highlighted in the previous example, it is apparent that the compilation of 12,812 photographs in 138 albums required a sophisticated set of arrangements in order for the incoming photographs to be processed, organised, catalogued, and placed in albums. In addition to providing the viewer with some insight into the logistics of internal album production, the caption on the back of this print reminds us that material images have at least two sides. The backs of photographic prints rarely receive the same scholarly attention as do the images on their fronts. However, in many different contexts, the reverse side of prints can offer valuable evidence of the ways photographs are organised, catalogued, and used. Such evidence is increasingly of interest in the study of photographic archives for it departs from conventional concerns, focusing on the interpretation of particular images or genres, and

directs our attention to the commercial, administrative, and educational uses to which photographic images are put.[24]

P79/79, "667 Mossband, Going on Shift No. 3" (figure 5.18), is one of a relatively small number of photographs in the Gretna series in which workers are depicted as the main subject matter of the image.[25] In terms of composition, the image is taken from a tight angle, contrasting with the spacious, wide-angled views presented in many of the album prints. However, this up-close stance presents the viewer with an intimate glimpse of everyday life of workers in the Mossband site. A large group of women forming an orderly queue are pictured as they wait in what seems to be one of the factory's railway stations. The women, some of them smiling and acknowledging the presence of the camera, are depicted as quietly awaiting their turn to start their shift. While the composition of the image conveys some of the qualities of a snapshot, especially its seemingly spontaneous character and the lack of formal arrangement of the women within the photographic frame, it succeeds in portraying the Gretna factory as a functioning community of workers.

This message is also evident in the preceding photographs, P79/77 and P79/78 (figure 19). In these images, the photographer, who has taken pictures from the same position over a period of time, captures the influx of the factory workers as they assemble under the dutiful observation of female officers. P79/77, the first in the series of three photographs (entitled "665 Mossband, Going to Shift No 1") was taken at the moment when the first group of workers arrived at the station. The small group depicted walking towards the gate, provides some further spatial context that is not discernable from the

[24] Schwartz, "Materials".
[25] Relative to the proportion of photographs in the album series that depict infrastructure.

third image in the series. In this image, the photographer, who is close to the entrance gate frames the image around the entrance of the station and the surrounding infrastructure. While these images do not portray the progress of construction in the way characteristic of earlier albums, the themes of orderly progress and efficiency continue to provide the subject matter through a visual narrative of steadiness and indeed steadfastness. There is no place here for images of the unexpected, still less of accidents in the workplace. Everything here goes to plan. Hence the image of the group of women workers depicted as orderly, contained, and to be heading for their shift, reproducing an overarching narrative of progress and efficiency—a cornerstone of Pearson's outward facing corporate image.

***

This chapter has explored the form and content of the progress album, one of three types of albums in the Pearson collection introduced in Chapter 4. Defined as an album with a limited audience, consisting principally of members of staff and the client, and compiled in-house by the company's drawing department, the progress album displays a particular set of material qualities that set it apart from the portfolio album and the presentational album types analysed in Chapter 6. In these albums, the use of visual narratives to depict the progress of construction is accompanied, and sometimes qualified, by accompanying annotations in pen and pencil intended to highlight particular features or to note matters requiring further investigation. Such albums were essentially working documents, as suggested by the notes in multiple hands found across the series. They provide insights into how photographs were arranged in order to ensure effective communication within the company concerning the execution of contracts relating to works at a distance. Through a series of examples, drawn from

within the UK and overseas, this chapter has shown that the meaning of such photographs is closely linked to the material forms in which they were arranged and the uses to which they were put.

Chapter 6: Photographic albums and corporate image

The focus of the previous chapter was on the use of photographic albums in the company's internal communication systems. This chapter concludes the empirical research section of the thesis, and here, I pay attention to the uses of photography to communicate externally, to both current and prospective clients. commemorating the successful completion of a contract. In this chapter, following on from Chapter 4, I present three broad case studies relating to the remaining two album types, which are outward-looking in their communication functions: the portfolio album and the presentational album. By focusing on how Pearson used photography and photographic albums, I shall show how photography was employed as an active tool in promoting the firm's status as a prestigious and competitive contracting company. As Paul Garner and John Spender (Lord Cowdray's biographer) have shown (see Chapter 1), Pearson was a highly competitive contractor. As these authors have highlighted, the company's strategy in winning business contracts was to outbid competing contractors by placing the lowest bid. With contractors such as Pearson eager to manage the construction of high-profile national and international infrastructure, the tendering process was highly competitive, requiring not only demonstrable expertise in construction practices, but also, a well-crafted external image that displayed the company's engineering rigour, which helped to demonstrate credibility.

By the 1920s, Pearson's résumé of construction projects was global in its geographical scope, and varied in terms of types of infrastructure built and managed by the company. As highlighted in Chapter 1, this included well-known projects such as the Hudson River Tunnels in New York, the Blackwall Tunnel in London, the Tehuantepec Railway in Mexico, and the Sennar Dam in modern-day Sudan.[1] A survey of the company's

[1] The Tehuantepec Railroad: Mexico's White Elephant", *Pacific Historical Review* 22, no. 4 (1953): 373–82.

practices pins Pearson's success to a few crucial factors that I outline here. Perhaps the principal factor was its location. The company's move from Bradford to London in the 1880s (a move that coincided with the start of Pearson's photographic archive), offered the firm the opportunity to be exposed to, and to bid for, larger and more complex projects than those with which it had been involved as a small-scale, provincial brick-laying company. Its location in the capital—in Parliament Street, close to Government and the 'centre' of the British Empire—amplified the opportunity to bid for international infrastructure projects which, in turn, increased the apparent prestige of the company's portfolio to potential foreign clients. The success of the firm was also closely tied to the political career of its director, Lord Cowdray. It has been argued that Cowdray's position as a member of the House of Lords placed him and his firm in a favourable position to bid for and win contracts for government infrastructure projects, both in Britain and overseas.[2] As Garner has highlighted, Lord Cowdray's social network in politics and engineering, equally posed an advantage in the access it afforded to knowledge of foreign investments and sources of capital in the City of London. The director's own entrepreneurial history, as the grandson of the company's founder Samuel Pearson, fits the mould of the nineteenth-century British family-owned entrepreneur, who in Pearson's case, began working at the company at the age of 17, and through accumulated work experience, and shifts in family dynamics, rose to the role of director, pushing S. Pearson & Son to national and international heights.[3]

John Spender, Desmond Young, and Keith Middlemas, who wrote about Cowdray in the context of well-known Victorian engineering contracts, have highlighted his

[2] Garner, *British Lions*; Young, *Member for Mexico*.
[3] Dummett, *Gentlemanly Capitalism*

entrepreneurial instinct and his self-learned finance and accountancy skills.[4] Spender, Young and Middlemas argue that these were fundamental in Cowdray's ability to offer the company the financial security, leadership, and ambition—critical factors in the firm's success in bidding for contracts where Pearson had no significant previous experience. Lord Cowdray's lack of formal training in engineering was compensated by his employment of a team of highly skilled engineers such as Sir Ernest Moir (part of senior management) and Sir Alfred Hopkins (senior engineer), who had the technical expertise and experience necessary to tackle complex engineering works successfully.[5] However, attributing the firm's success to the factors outlined above—a desirable location in central London, political and financial connections, sound corporate finances and leadership, and skilled engineers—carries the risk of occluding the contribution made by Pearson's carefully constructed corporate image of excellence, prestige, and security that drew its strength from the company's understated, yet impressive, photographic archive. It is Pearson's curated external image with which this chapter is concerned, looking specifically at portfolio and presentational albums. While these album types have been surveyed and analysed in Chapter 4, in the present chapter, I engage with them in an intensive and critical way in order to demonstrate their practical applications as external signifiers of Pearson's corporate image.

Broadly speaking, section 6.1 looks at two portfolio albums Q39 and Q40, both entitled: 'Miscellaneous Pearson Works'. In this section, I will do a visual and material analysis

[4] See: Spender, *Weetman Pearson*; Middlemas, *The Master Builders*; Young *Member for Mexico*.
[5] Sir Ernest Moir, for example, was educated at University College, London and was a member of the Institution of Civil Engineers. His career span several decades; engineer on the southern cantilevers of the Forth Bridge in Scotland, designer of the hydraulic shields which were used in underwater tunnel excavating. He became one of the company directors in 1900, and joined the Ministry of Munitions Council in 1915. See: "Moir, Sir Ernest William," Who's Who, last modified, 2007, http://www.ukwhoswho.com/view/10.1093/ww/9780199540891.001.0001/ww-9780199540884-e-214220

to explain their importance in constructing the firm's corporate image directly to potential clients. The portfolio album is unique in the Pearson album typology. From a material and visual narrative point of view, this type of album served the purpose of displaying Pearson's 'greatest hits' as a contractor, presenting the viewer with a selection of five-to-six photographs of a series of contracts which, together, displayed Pearson's technical competence and international reach. For the first case study (6.1.1), I focus on the opening and closing photographs of Album Q39, depicting a photograph of an oil painting of Lord Cowdray, and an external view of the company's head office as signifiers of an image of professionalism and prestige. The second case study will look more in-depth at a series of five photographs of the National Harbour in Malta from Album Q40. The analysis of these photographs, will show how photography was used as mediator between the company and prospective clients, and by adopting similar design strategies employed in the publication of early nineteenth-century railway lithographs, Pearson was able to craft visually and materially a corporate image of the Victorian contractor; prestigious, global and ingenious.

In section two (6.2), I focus on AlbumQ36, one of the two presentational albums in the Pearson collection, whose subject matter is the depiction of the construction of the 'Sennar dam and Gezira irrigation works, Sudan'. Commissioned by the Anglo-Egyptian government, construction of the project took three years to complete and, at a value of £3,864,400, the contract was Pearson's largest canal and irrigation project at the time. The album's material qualities show it to be particularly simple in design and formal in the choice of materials used. It features black leather binding, a gold-leaf centre title and simple graphic decoration. Unlike work-in-progress albums, the material qualities of presentational albums (and portfolio albums) indicate these types of albums were very likely to have been produced professionally. Copies of the Sennar Dam

album in The British Library and the Institution of Civil Engineers indicate the currency of photography as an object of exchange between colleagues in wider professional networks. Thus, the production, circulation, and consumption of an album of this type, gifted to clients and members of the company's wider circles of colleagues and friends, demonstrates an awareness of how photography could be manipulated and transformed into a commodity to cement existing personal and corporate relations.

The two types of album discussed in this chapter—portfolio and presentational—share a wider common constituency: Pearson's external network, including current and prospective clients, industry colleagues, and institutional affiliates. In order to speak and to appeal to this constituency, both album types also share a set of material qualities designed to project a corporate image of excellence, efficiency, and global reach, including: sophistication and elegance in production, simple chronological visual narratives, use of photographs taken by commercial photographers, and a very clear visual strategy in the framing of the subject matter. The final part of this chapter discusses the networks of circulation and consumption of these types of albums.

6.1 Portfolio albums

6.1.1 Album Q39, 'Miscellaneous Pearson Works'

The portfolio albums comprise a sequence of six albums within the wider collection, presenting the viewer with a sample of often five to six photographs of the company's most successful national and international contracts. At first glance, there appear to be few differences between this type of album and the presentational albums which I will explore in the next section of this chapter. The purpose of the portfolio album was to

reach members of external constituencies that, perhaps, had not worked with Pearson before, or through which the firm might potentially be able to secure new infrastructure contracts. In Chapter 4, I categorised this type of album as 'portfolio' based upon several factors: the nature of the visual narrative, the 'curatorial' selection of the types of images, and the physical qualities of the albums themselves, including captions and descriptive text used. Compact versions of portfolio albums translated into French, Spanish, and Arabic, demonstrate the international nature of the targeted audience, as well as reflecting some of the company's core civil engineering business interests in Northern Africa, and South America.

This type of album presents the viewer with a standardised viewing experience similar to one of flipping through the pages of a commercial industry catalogue. The album is divided into five or six parts, each corresponding to a particular contract, and each part is preceded by a contextual page containing useful information and construction data related to the contract which helps situate the infrastructure in space and time. The choice of images in portfolio albums is significant. While progress albums contained photographic materials sourced from both commercial and non-commercial photographers, the portfolio albums (and presentational albums) were exclusively comprised of photographs taken by commercial photographers. Here, standard image and album sizing, uniformity in the choice of printing processes, finish, framing of the subject matter, and consistency in image captions and printed text were paramount to ensure continuity and visual harmony. In relation to the wider Pearson photographic collection landscape, portfolio albums were aptly named: 'miscellaneous Pearson works' preceded by the 'Q' reference system set in place by the company. The albums feature contracts which range from the Great Northern and City Railway in London, to the Port of Pará in Brazil.

In some portfolio albums, the last page featured a photograph of Pearson's head office, not only as a signifier of its geographical location in the centre of Britain's political hub, but also as a corporate symbol of excellence and prestige. Figure 6.1, the last photograph in Album Q39, 'Miscellaneous Pearson Works' presents the viewer with a perspective of Pearson's head office in Parliament Street, Westminster. While the exact geographical location of the building is not given in the caption—'contractors, London' is the only information which geographically situates the building—the three storey tall building is imposing. A few pedestrians walking along the pavement serve as markers of scale. The façade of the building is decorated, contrasting with the simplicity of the neighbouring building. In particular, the entrance on the left, shows stairs leading to the main door—it is inviting to imagine what the interior of the building would look like; the type of furnishings used, or even what Lord Cowdray's office may have looked like. The series of decorative wreaths at top of the building may indicate where some of the stained-glass panels I referred to in Chapter 2 were placed. Even without the company's address in London, this photograph enables the viewer to 'paint' an image of Pearson as a well-established and prestigious company. The placement of this image at the end of this album is strategic, leaving the viewer with a last visual message about Pearson.

It is worth looking at figure 6.1 in tandem with figure 6.2, which is the first image in the same album. Entitled: 'The Right Hon. LORD COWDRAY, President of Messrs S. Pearson & Son, Limited' this image is a photograph of an oil painting of Lord Cowdray.[6] It is intriguing that a photograph of a painting was used in this album, instead of a photographic portrait of Cowdray himself. There are a few possibilities which can explain this choice. Firstly, a formal photographic portrait would more likely have been taken by a prestigious London photographer in their studio. The practicalities

[6] Pearson collection finding aid, Q39, 'Volume prefaced by photo of oil painting".

involved in setting the scene for a photograph and a painting differ, and offer the sitter contrasting experiences of having their image depicted. Sitting for a photographic portrait was a relatively quick experience; after the photographer set the scene with props or a backdrop, and prepared the photographic equipment, the sitter's image could be captured more or less instantaneously. Sitting for a portrait painting was an experience shaped by artistry and craft, and the time necessary to paint the sitter's image. Therefore, a portrait painting was shaped by an experience that was different to that of a photographic portrait. Lord Cowdray's painted portrait depicts him as a powerful man, with his status and wealth emphasised, and indicates that Cowdray either considered himself (or was considered by others) too important to sit for a photograph on this occasion. Figure 6.shows a crafted message of leadership and power. Standing next to a leather chair, Cowdray's gaze is directed at the viewer. Wearing a suit, waistcoat, and tie, with his right hand on the chair and his left hand in his pocket, the director's stance is upright and occupies most of the space in the foreground of the painting. Similar to figure 6.1, this photograph of Lord Cowdray is strategically placed at the start of the album as an opening visual message to the viewer. Here, a message of leadership and status is presented as a starting point to the album.

Album Q39 includes photographs from fourteen contracts spanning rail (Great Northern and City Railway in London, Dorada Railway extension in Colombia) and maritime infrastructure (port works in Brazil, harbours and docks in Seaham). From start to finish, the album is a comprehensive visual exploration of Pearson, starting with the company's head figure, through the extensive range of contracts depicted, to the image of the firm's head office as the closing note, this visual narrative was well-orchestrated to present an image of corporate leadership.

Given that these albums were produced for external use, it is difficult to ascertain exactly how many copies of each were produced, how they were distributed, and to whom they were given. Because of to the material similarities between portfolio and presentational albums, it is likely that both types were produced by external companies. However, it is worth taking a small diversion here. Figure 4.43 (Appendix D), 'Ivybridge Viaduct', taken in 1892 is a photograph of the South Devon doubling, part of the Great Western Railway. Taken by the side of the viaduct, the image shows the viewer the scale and geometric 'rhythm' of the completed infrastructure, as it 'tears' through the foreground, midground, and background of the image. The completed work is surrounded by the Devon landscape in the background. A work-in-progress photograph of the viaduct in Album P20, 'Devon Doubling Railway/ Lambourne Valley Light Railway' (figure 6.3) shows the same landscape, but presents the viaduct in an unfinished state. Taken from the same vantage point, the framing of the subject matter is wider in comparison to figure 6.2, however, the scaffolding in the midground, and the uncompleted arches contrast to the polished finish of figure 4.43 in the Album Q39. Of relevance here, is the reproduction of figure 4.43 in journal *The Engineer* (figure 6.4). The etching, reproduced on page 12, in the July 1892 edition of the journal, is placed under the title: 'Great Western Railway Works, South Devon—Ivybridge Viaduct Messrs Pearson and Sons London, Contractors'.[7]

In a similar fashion to the stylistic strategies used to caption photographs in the portfolio albums, Pearson's works as captioned indicating the name of the contract, the company's trading name and location. This small example, while not directly related to the portfolio albums discussed in this section, is nonetheless, a fascinating example of

[7] Unknown author, "Great Western Railway Works, South Devon—Ivybridge Viaduct Messrs Pearson and Sons London, Contractors" in: *The Engineer* (London: George Reveirs).

the use of how external constituencies were reached. Whether through portfolio albums, or, as I will discuss in section 6.3 through presentational albums, it is clear that photography was used carefully and strategically to communicate externally.

6.1.2 Album Q40, 'Miscellaneous Pearson Works': National Harbour, Malta

Following on my analysis of three photographs from Album Q39, the case study presented in this section continues to explore the portfolio album type, with a more in-depth consideration of some of the points made in the previous section. Here, I consider the 'National Harbour, Malta' section of album Q40, 'Miscellaneous Pearson Works'. This six-page section is the second of eight projects presented in the album with a focus on maritime infrastructure. Other contracts featured in the album include: the construction of the Admiralty Harbour in Dover, commercial docks in Surrey, and the harbour and railway in Port Talbot, Wales.

The National Harbour section of this album shows five photographs depicting the construction of the harbour in Malta, as well as a one page textual introduction to the contract as follows:

> NATIONAL HARBOUR, MALTA. This work was constructed for the British Government, and consists of two Breakwaters across the entrance of the Grand Harbour, Valetta [sic]; one at Ricasoli, 530 ft long, and another at St. Elmo, 1,570 ft long, each built of concrete large blocks, weighing up to 40 tons each.
>
> The blocks for the head at St. Elmo Breakwater were founded at a depth of 70 ft below water level. About 150,000 cubic yards of concrete were required for the work, the greater part of which was set by divers under

water. The work was constructed under the supervision of the Government Engineers.[8]

The textual information provides an intriguing contextual background to the sheer scale of the construction, and gives readers some interesting statistics which help them understand the engineering processes by which the infrastructure was built, suggesting the complexity and skill with which—the company hoped—readers would come to associate with Pearson. The style in which this type of text—common throughout the portfolio and presentational albums— was written provides the viewer with a perspective from the contractor. The key points from the text above—client (British Government); infrastructure type (breakwaters); location (Malta); dimensions; brief description of how the infrastructure was built (part of the work was done underwater); and by whom the work was supervised (Government Engineers)—encapsulate the collaborative nature of the work carried out under the supervision of the client. Moreover, the text is crafted in a format which presents Pearson, the contractor, in a favourable light, demonstrating its skilled manpower, and its capacity to bring to fruition complex engineering projects.

Pearson's extensive infrastructure work in Malta was photographed by Richard Ellis, a British photographer based on the island.[9] This is one of the few Pearson contracts where the identity of the photographer is known, and it is therefore worth spending some time analysing Ellis's photographic contribution in the context of the Pearson archive. There are nine albums (excluding references to the Malta contracts in portfolio

[8] PEA Q40, National Grand Harbour, Malta.
[9] Richard Ellis was born in London in 1842. At the age of 19, Ellis opened a photographic studio in Valletta, Malta. His photographic work on the island spans six decades, and the 36,000 to 40,000 glass plate negatives taken by Ellis constitute a major visual archive of Malta. See: Ian Ellis, ed. *Richard Ellis: The Photography Collection: Malta 1862–1930* (San Gwann: BDL Publishing, 2011).

albums) dedicated to the construction of dry docks, harbours, and other maritime infrastructures in Malta. In practical terms, Ellis's work comes to 455 photographs, including impressive panoramas which provide the viewer with an outstanding level of detail, not only in relation to the ability to look at minute construction details, but also in relation to the framing of the subject matter, and how this framing, often from strategic vantage points, was crucial in showing the scale of the construction sites.

While Ellis's panoramas do not feature in the portfolio album, the photographer's stylistic choices in showing the scale of construction with a high level of detail are equally present in the National Harbour photographs in the portfolio album, Q40. The first National Harbour image in the portfolio album, Q40/13, is captioned: 'GRAND HARBOUR, MALTA. 16.—General View of Harbour, showing the completed Breakwaters. S. Pearson & Son Limited Contractors, London' (figure 6.5). The text itself is succinct, in line with the type of captions used in portfolio and presentational albums. Captions were used to contextualise both the work and to guide the viewer's gaze when looking through the album. The image, taken from a considerable distance at the opposite end of the breakwaters, shows the scale of the construction work, depicting the wide open sea, interrupted only by the two breakwaters, which create an informal visual divide between both planes of the image. The photographer's name and the date is valuable evidence of authorship which is seldom seen elsewhere in the collection. However, in the case of the Ellis photographs, there is no archival evidence of, for instance, the costs involved in producing 455 images.

However, it is the following image, Q40/14 (figure 6.6), which is most successful at depicting the company's corporate reach. Taken at the St. Elmo breakwater, the camera is placed on the edge of the construction site. The subject is framed quite tightly

ensuring the viewer's attention is focused on complex engineering activity. Several concrete blocks line both sides of the traversers (platforms through which objects can be moved from one side to another) which, in turn, are framed by two large cranes, each of which has 'S. Pearson & Son Ltd' painted on its front side. Various pulley mechanisms, men at work, huts, and machinery line the image. It is, however, the two large cranes in the background of the image that warrant some attention. In line with the overall objectives of the portfolio album, the inclusion of the cranes, labelled with Pearson's company name, visually and metaphorically asserts the company's corporate image as imposing, and prestigious. Here, I argue that the inclusion of this image in the album was not an accident. The opening text for this section was deliberate in highlighting the complex nature of the work needed to place the concrete blocks in the underwater foundations. The presence of a small group of workers in the right-hand side of the image shows the viewer the scale of the concrete blocks, thus evidencing the precision and technical knowledge necessary to run an operation of this nature successfully. And the cranes proclaim clearly that this was Pearson's project.

A recurring theme in both the portfolio and presentational albums is the depiction of challenging work environments, which further enhanced Pearson's corporate image as a contractor with the technical skill needed to tackle adverse environmental conditions. Q40/15 (figure 6.7) portrays the St. Elmo breakwater and the building structure (traversers, cranes, and concrete blocks) from a different perspective. By placing the viewer on the edge of the coast, Richard Ellis shows the harsh weather conditions workers and engineers to which were subjected. Captioned: 'GRAND HARBOUR, MALTA. 18—Rough sea at St. Elmo; the rail level on the staging was 34 feet above mean water level. S. Pearson & Son, Limited. Contractors, London', the photograph shows infrastructure staging that was usually higher above water level. There was a

concerted effort to ensure Pearson's corporate image of security and progress was visually depicted in its most favourable and capable light. The sea, while rough and almost placing the staging infrastructure in jeopardy, did not cause Pearson's engineers any equipment and problems; the Pearson cranes remain unaffected.

A sense of security, and of everything going according to plan, is equally projected in the last photograph of the National Harbour section of Q40, 'Ricasoli Arm, St. Elmo staying in distance' and numbered Q40/16 (figure 6.8). In this image, Richard Ellis offers a generous view of the construction site, including the staging infrastructure—the recurring subject matter in this series—and the construction of the breakwater. From Ellis's camera perspective, we can see the open sea on the right, workers scattered along the breakwater that is under construction, stacks of concrete blocks along the breakwater and the staging infrastructure, as well as the St. Elmo breakwater in the background. This photograph includes most of the iconography expected to be seen on a construction site. The familiarity of the scene is reassuring, workers are dispersed across the breakwater taking on various tasks, and engineering or managerial staff are gathered in the foreground overseeing the work. This type of imagery, projecting security, the overcoming of environmental adversities, everything running as it should, and the sheer scale of materials and infrastructure were crucial to portray Pearson as a trustworthy, capable, and renowned global contractor.

By using the National Harbour, Malta section as an example of the company's use of photography to convey capability, and the two examples from section 6.1 to show how Pearson used photography to craft a visual message of leadership and prestige, I have demonstrated how this type of album was produced and employed as a tool to promote its services to a wider national and international constituencies. While archival evidence

in the collection does not demonstrate the level of effort spent on selecting, producing, and distributing this type of album; whether it is in the lack of evidence of photographic authorship or the lack of financial records relating to the costs of photography, the presence of photographic albums of this type—and presentational albums that I will discuss in the next section—shows the fundamental role photography played in the company's corporate processes of communication and advertising.

6.2 Presentational albums: Q36, 'Sennar Dam and Gezira irrigation works, Sudan'

6.2.1 Context

In October 1922, Pearson secured the contract to construct the Sennar Dam and Gezira Irrigation Project by placing the lowest bid (£3,864,400) among the group of contractors invited to tender by the Anglo-Egyptian government.[10] Over a three-year period, between 1922 and 1925, Pearson was responsible for the construction of the project.

During the nineteenth century, Sudan experienced 60 years of Turco-Egyptian dominance, and a 17-year period under the rule of the Mahdist regime. In 1899 the Anglo-Egyptian Condominium was formed, whereby Sudan was governed by a hybrid government consisting of British and Egyptian officials as co-governors of the region. The partnership was not equal, however; Britain was effectively the senior partner in the arrangement, reflected in its position as head of the administration of Sudan through the role of the Governor-General.[11] The terms of the agreement between Britain and Egypt

[10] See: PEA box A1 Miscellaneous: Canals and irrigation and water power.
[11] See: Muddathir Abdel-Rahim, *Imperialism and nationalism in the Sudan: a study in the constitutional and political development, 1899–1956* (Oxford: Clarendon Press, 1969); Arthur Gaitskell, *Gezira: a story of development in the Sudan* (London: Faber and Faber, 1959); and Peter Holt and Martin Daly, *A history of the Sudan: from the Coming of Islam to the Present Day* (Oxford: Routledge, 2011).

meant that, from a British perspective, Sudan was not considered a colony, therefore its affairs were dealt with by the Foreign Office in London.

Between 1899 and 1925, Sudan was managed by three consecutive Governors-General: Sir Reginald Wingate, Sir Lee Stack, and Sir Geoffrey Archer. It was under the leadership of Wingate that significant infrastructure developments were undertaken; he was keen, in particular, to develop the region's communications systems and transportation infrastructure, and to make use of Sudan's rich agricultural resources, specifically in the Gezira plain. During the first decade of the Anglo-Egyptian government in Sudan, several railway lines and harbours were built with the objective of beginning the processes of improving the region's infrastructures. Situated on the edge of the Sahara desert, measuring 200 miles long and 80 miles across, the Gezira plain marks the point at which the Blue Nile and White Nile rivers converge. Early surveys in the 1900s discovered that the plain's geographical location and natural physiology met the conditions for the cultivation of cotton during the flood season. However, because of difficulties in securing funding from the British Government and foreign investors (particularly after the end of the First World War) and in settling disagreements with land owners, it took twenty-five years for the irrigation project to be concluded.[12] Under the consecutive mandates of both Governors-General Sir Lee Stack and Sir Geoffrey Archer (1917–24 and 1924–26 respectively), the construction of the Gezira Irrigation Project was awarded to the consulting engineers Coode, Fitzmaurice, Wilson & Mitchell, and to Pearson as the contractor. Pearson's key onsite staff

[12] PEA Box 14, "Contract for the construction of a dam and subsidiary works at Makwar on the blue Nile and the construction of irrigation canals and subsidiary works for the Gezira irrigation scheme".

members included Sir Frederick Hopkinson in the role of director in charge, and J. Gibson as the agent in charge.[13]

The contract between Pearson and the Sudanese government, signed on 17 October 1922, specified, under a heading 'other services', the miscellaneous services Pearson was contractually obliged to supply beyond the construction of the infrastructure itself, such as: maintenance of houses, gardens, motors, electric lighting, and a water supply.[14] The final clause in this section also set out Pearson's responsibility for the commissioning of a photographer to document the construction of the infrastructure. Clause 6 specified:

> The provision of a qualified photographer with all the necessary apparatus materials and accommodation and the supply of copies of photographs to the Government free of charge and to the Government staff at cost price such photographs to be not less than 12 inches by 10 inches and to be taken by positions selected by the Resident Engineer and at such intervals as he may direct.[15]

This paragraph is the contextual cornerstone for the second case study of this chapter. In it I analyse the presentational album featuring photographs taken by the photographer who was commissioned on the terms and conditions set by the client which are outlined above. Here, it is important to 'unpack' the clause in the contract. On the surface, the clause shows an imbalance of power between Pearson, as the contractor, and the Sudanese government, as the client. The wording shows no room for negotiation of the

[13] PEA Box 14, "Contract".
[14] PEA Box 14, "Contract", p. 23, clause 6.
[15] PEA Box 14, "Contract", p. 23, clause 6.

terms, or alteration in how the photographs were to be supplied to the Government (free of charge), nor should the images be supplied in dimensions that are not stipulated in the clause. The power dynamics intensifies upon the indication that the selected photographer should work under the direction of the resident engineer. This places the photographer at the centre of an interesting power shift: the photographer's salary, materials, and photographic reproduction costs were paid for by Pearson; however, the photographer worked directly with the resident engineer to capture views the engineer thought were worthwhile. The total output of the photographer's body of work produced in the depiction of the construction of the Sennar dam and the Gezira plain irrigation system is unknown.

6.2.2 Visual and material analysis

The Pearson collection holds three photographic albums (two work-in-progress albums and one presentational album) that illustrate the construction of the infrastructure. Combining the three albums, there are 188 photographs acquired from three distinct sources: the commissioned photographer (known only by the initials, F. B.), a member of the Pearson engineering staff (Frederick Hopkinson, onsite director in charge), and the Royal Air Force, which provided six aerial photographic prints of the dam.[16] The majority of the photographs in the three albums were taken by the photographer, F. B., however, and it is very likely that a much larger number of photographic prints were produced, of which those in the albums represent a curated selection. The three albums called "Sennar dam & Gezira irrigation works, Sudan" have corresponding business records that comprise contract specifications, schedule of prices, correspondence,

[16] Photographs from Frederick Hopkinson and the Royal Air Force can be seen in progress albums Q37-1 and Q37-2.

certificate of completion, several booklets reproducing some of the photographs taken by F. B. and the descriptive note that appeared in the commemorative album, breakdown of tools kept on site, and a bronze embossed souvenir paper weight. However, of relevance to this section, I will focus on the presentational album Q36—which, despite some conservation work done to replace the spine, maintains its original black leather cover and back, measuring 37.5 × 33 cm and has 20 photographs arranged over ten pages. In what follows, I will present the findings of a detailed material and visual analysis of Album Q36—one that pays close attention to album categories, editorial strategies, and overarching narratives, audiences, and networks of circulation.

Q36 (figure 6.9), has black leather binding, gold leaf centre title and graphic adornment which indicate this album, unlike the work in progress albums discussed in the previous chapter, was not an in-house Pearson production, but likely undertaken by a third party. The album's visual narrative is presented through a chronological sequence of photographs illustrating the construction progress from 1923 to 1925. A closer inspection of Album Q36 reveals, however, an underlying sub-narrative of scale. This sub-narrative unfolds through particular aesthetic strategies that emphasise the magnitude of the construction project. In line with the editorial strategies common to presentational albums, and portfolio albums discussed in the previous section, this album starts with an extensive one-page descriptive note designed to familiarise the viewer with the historical developments leading up to the construction of the infrastructure scheme. The descriptive note also outlines some of the biggest challenges faced by contractors in the execution of the project, firstly, the depth of the eastern, blue Nile (where temporary dams were built to avoid spoiling crops), and secondly, the three-year timeframe for completion of the project imposed by the Sudanese government.

The second page of the album lists key institutional and individual interested parties related to the construction: the Sudanese administration under the role of the Governors-General, the consulting engineers (Coode, Fitzmaurice, Wilson & Mitchell), the contractor (S. Pearson & Son), and the sub-contractors for the sluice gates (Ransomes & Rapier Ltd). Key individuals listed by name include the Governors-General Sir Lee Stack and Sir Geoffrey Archer, the resident engineer H. Johnstone, and Pearson's director-in-charge, Sir Frederick Hopkinson. Clearly absent from this list is the photographer, 'F. B.'.

It is clear from the photographs in the album, that the photographer employed specific visual strategies to depict an overall sense of the magnitude of the construction. To show the viewer the impressive human and technological labour that went into building an infrastructure of that nature, the photographer often took advantage of vantage points to obtain wide and uninterrupted views of the construction site. Photography recorded infrastructure in a realistic manner that allowed viewers to visualise the construction site as if on the spot. Human labour and machinery placed within the wider man-made and natural landscape were often depicted to provide a sense of scale—as it would be difficult to imagine the true scale of construction without size markers. And, finally, the presence of elements of industrial iconography, such as smoke and debris, impressed upon viewers what it was like to be at the construction site at that time. Most of these visual strategies are common not only in the album presented in this section, but also in the other presentational album, and in the portfolio albums (both types discussed in Chapter 4) which are outward looking in their functions and circulation. I am, however, hesitant to argue that the strategies outlined above are what visually define the 'industrial image'. As I argued in Chapter 2, the concept of the 'industrial image', or

industrial photography, should be seen through the lens of a complex set of visual representations, iconographies, and needs (what did engineers *need* from photography?), and should take into account images which do not immediately align with the canon of industrial photography. Equally, the 'industrial image' should be seen through a lens which engages with the modes of photographic production, circulation, and consumption. It is worth highlighting here, once again the power dynamics between the photographer, contractor, and resident engineer (discussed at the start of this section). While at the surface it may seem that the photographic body produced by F.B. was shaped by the vision of the resident engineer, it is worth reiterating, as I pointed out in Chapter 3, engineering was a profession that was inherently visual, and translating complex engineering ideas to maps, diagrams, and photographs was integral to what it was to be an engineer.

In the case of Album Q36 analysed in this section, all of the visual strategies outlined above are evident in the photographic prints in the album. In what follows, and with respect to the chronological arrangement of the album, I discuss three photographs that exemplify the visual strategies employed by the photographer in his depiction of the dam's construction. Q36/6 (figure 6.10), placed on the third page of the album, is a 10 × 12 inch platinotype depicting a deep excavation.[17] The presence of the platinum prints in Album Q36 is very significant; the platinotype was the most chemically stable of photographic processes, used for high-end photographic work, and had largely disappeared by the outbreak of the First World War. In light of the timing of the album,

[17] A platinotype, or platinum print, is a photographic process first patented in England by William Willis in 1873. The process consisted of coating the paper with a solution of platinum, placing the negative directly on the platinum coated paper, and exposing the image. Once developed, fixed, washed, and dried the final image resulted in a stable, matte soft finish. See, Reilly, *Care and Identification of Nineteen-century Prints*, 8; "Platinotype," The Atlas of Analytical Signatures of Photographic Processes, The Getty Conservation Institute, last modified 2013, https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/atlas_platinotype.pdf

almost a decade after the start of the war, it is evident that there were clear intentions behind the use a high-end photographic process to depict the construction of the dam. Taken in 1924, roughly a year after the construction of the infrastructure began, the photograph is a fine example of how scale was represented by the photographer. The foreground of the image reveals the photographer's physical position: a west-facing vantage point from where the full extent of the excavation can be seen and photographed. The short shadows visible on the left side of the image indicate that the photograph was taken when the sun was high in the sky, allowing the photographer to use as much light as possible to obtain a well-exposed negative. The photographer's strategic position, overlooking the excavation shows the viewer an immense landscape demonstrating the magnitude of all of the elements involved in the construction; the workers in the mid-ground, scattered along the excavation site, almost become part of the landscape, yet at the same time, and in comparison to the wooden structure on the left of the image, show the viewer the imposing scale of the works, and the depth of the excavation. Fourteen cranes lines placed along the wooden 'scaffolding' and in the background, remind the viewer of the impressive technological prowess of this construction. Here, it is worth echoing a reference to the technological sublime discussed in Chapter 3. In particular, the ways in which the machine was seen as an agent of progress and modernisation.[18]

Taken as a whole, the figure 6.10 places the viewer in a physical and metaphorical vantage point that takes in both the scale and the chaotic nature of the construction site; human labour is visually reduced to the size and texture of rubble (particularly in the background of the image) and the landscape is populated with a multitude of scattered cranes. The viewer was, in this respect, able to understand this industrial scene at a

[18] See Chapter 3, section 3.1; Nye, *American Technological Sublime*.

distance, without having to experience the physical inconveniences of exertion, noise, heat, and smell that would have attended an on-site visit. For Pearson and other London-based interested parties, there was an intrinsic appeal (and value) in being able to circumvent geographic distance by viewing these photographs in the convenience of their London offices. There are similarities, here, to the appeal of travel photographic albums and their value to Victorian audiences who were able to 'visit' foreign locations through the pages of a travel album. As Joan M. Schwartz and James Ryan have emphasised, photography played a crucial role in making an increasingly globalised and interconnected world visually and materially accessible to wider audiences. Photography's indexical qualities of 'objectivity' and 'realness', applied to a variety of fields and industries, shaped how the world was documented and seen.[19] As it was thoroughly discussed at the start of Chapter 3, objectivity and accuracy were viewed as a significant quality in the engineering profession, and the role of photography in achieving those ends was recognised at an early stage.

In this section, I propose that images Q36/11 and Q36/12 (figures 6.11 and 6.12, respectively) are viewed together as two examples that show construction progress in a way that is different from the way chronological progress was represented in the work-in-progress album. Progress albums featured photographs taken at short temporal periods; every fortnight, at least, so that the viewer was able to follow construction progress in a way that convenient. The function of progress albums was to communicate internally to senior management how construction was moving along—photography was employed, in this sense, as a highly efficient and affordable project management tool. However, in Album Q36, figures 6.11 and 6.12, which were taken six weeks apart, between January and March 1925, from what appears to be the same vantage point (note

[19] Schwartz and Ryan, *Picturing place*, 2.

the similar captions and composition), allow the viewer to see progress on a different time scale. Here, in the presentation album—an album whose function was outward, and not to support management in visualising progress—time, as it were, is presented with wider gaps between images than in progress albums.

Both images, share the same caption (with the exception of the date): 'SENNAR DAM. General view downstream, looking east'. Figure 6.11, taken in January, shows the construction site at an early stage of development. Similar to figure 6.10, this image and figure 6.12 once again, show the viewer the magnitude of the construction of this infrastructure. By the employing the same visual strategies I outlined in the visual analysis of figure 6.10, a wider sense of visual consistency emerges. This is due, in part, to the fact that the photographer was working under the supervision of the resident engineer, but also the selection of images which are consistent in their framing of the subject matter, and format, ensured the overarching visual narrative present in the album was one of consistency, certainty and capability—a visual narrative which mirrored Pearson's own corporate image. Similar to the portfolio album, the presentational album was a visual and material construction that Pearson harnessed to show to clients and colleagues the scope of the company's technical skill and entrepreneurial strength.

6.2.3 Networks of circulation and consumption

Having explored portfolio and presentational albums in sections 6.1 and 6.2, this final section uncovers some of the elements of the networks in which outward looking photographic materials were circulated and consumed. In particular, I shall discuss the circulation of Album Q36 presentation album (analysed in 6.2). Pearson's global reach, reflected not only in the geographic range of the company's contracts, but also in the

way photography was employed as a tool to overcome long distance communications, is a common thread in this thesis. Senior Pearson staff were part of global political and financial networks, and affiliations comprising engineers, businessmen, and politicians. The idea of 'networks' discussed in this chapter should not be viewed as rigid social structures; rather, networks should be seen as a malleable structures comprising diverse layers of interaction and familiarity, encompassing a variety of constituencies including: immediate company colleagues, business partners, clients, professional acquaintances, and organisations such as the Institution of Civil Engineers. As Casper Andersen has noted, being part of such diverse and wide-ranging networks was crucial for British engineers to be at the forefront of developments in local and global politics, Empire, and financial trends—a strategy that, in Pearson's case, allowed the company to be an active competitor in the infrastructure and contractor marketplace.[20] Moreover, evidence in the company's archive (and elsewhere) of its wide-scale use of photographic images demonstrates the firm's understanding of photography as a medium and technology that enabled the circulation of a vision of global engineering expertise.

I began to unravel part of the networks of photographic circulation in Chapter 5, where I discussed His Majesty's Factory, Gretna albums currently part of the Ministry of Munitions papers at the National Archives. The albums, which are exact copies of the respective contract albums in the Pearson collection, reveal that this type of album was indeed circulated, albeit to a small group of individuals. This had to do in part with the nature of the contract: the natural secrecy surrounding the construction of munitions factories during the First World War, but also with the very nature of the albums themselves, which were used to monitor progress internally. Here, I look at wider networks of circulation focusing on examples of Sennar dam album copies found in

[20] Andersen, *British Engineers*, 57–86.

British and international institutions. The existence of several copies of presentational albums, is, I argue, a strong indicator of the role photography played in the company's external communications, and in presenting photographic materials such as albums as objects of esteem, relationships with Pearson's wider networks were cemented.

However, fully understanding questions of constituencies and photographic circulation using the Pearson collection is a difficult task. With no business records indicating photography and album purchase costs or production numbers, it is impossible to identify all of those who engaged with the Pearson albums at the firm, and through the social and professional networks in which those albums circulated. Copies of Album Q36 'Sennar dam and Gezira irrigation works', scattered in various national and international repositories—such as The National Archives, the Institution of Civil Engineers Library and Archives, the British Library, and the University of California—testify, in a small way, to the external circulation of the albums. Here, I will focus on the copy of Album Q36 housed at the Institution of Civil Engineers Library and Archives.[21] Material traces of the album's social biography in the institution are visible in its cover and very first pages. The cover shows signs of quite heavy use, particularly along the edges of the cover, and in the upper and lower external corners and the spine. The interior of the album cover, which has a label bearing the library's emblem, informs the viewer that this copy of Album Q36 was presented to the institution's library on 11 December 1925, five months after the completion of the irrigation project. The album was presented to the library by Sir Frederick Hopkinson, a senior member of Pearson staff, lead engineer on the Sennar dam contract, and a member of the institution. Hopkinson's business card, glued on the first page (figure 6.13), reinforces a few points

[21] Box 135, shelf 627E.

made throughout this chapter in relation to the inclusion of captions in the portfolio albums. By including a business card, Hopkinson achieved three things; firstly, the business card can be understood as a symbolic representation of Pearson's geographical centrality—a contractor based close to the United Kingdom's political heart and that of the engineering profession. Secondly, the business card can be seen to reflect Pearson's own corporate 'branding' of the album, effectively transforming a presentational album produced in a context of relinking memories of the irrigation scheme into a token of corporate image applied to business and professional networks. Thirdly, and quite connected to the previous point, the inclusion of the business card inscribed by hand "with the compliments of "can be understood as a personal gift to an institution to which Pearson was closely affiliated to.

Hopkinson's donation of a copy of Album Q36 to the institution should be seen through a lens of corporate savviness. As Britain's professional body of civil engineers, the institution was associated with prestige and excellence in the discipline. Presidents of the institution such as: Thomas Telford (Longdon-on-Tern cast iron aqueduct), Charles Vignoles (Nicholas Chain Bridge in Kiev), and Robert Stephenson (creator of the first passenger steam locomotive) were well-known engineers whose names and works are deeply connected to celebrated British engineering. Therefore, donating photographic materials to the institution's library can be seen as a way of adding Pearson's legacy to a celebrated group of men whose engineering feats continue to be celebrated today. Moreover, the inclusion of the annotated 'with compliments' business card, denotes the social currency this type of album held. It is worth revisiting Deborah Poole and the visual economy I discussed previously in Chapter 2. While there is little evidence of how presentational albums moved through wider networks of circulation, it is worth considering the geographical reach of these albums, and to speculate on the different

spaces of consumption in which these photographic materials were seen. The donation of Album Q36 shows how photographic materials gained currency, and how this currency changed when engaged with by different constituencies, in a different social spaces for different purposes. For example, within Pearson's custody, the presentational album was an object of corporate image, appealing to the company's legacy. At the Institution of Civil Engineers library, Album Q36 was in a space which promoted the exchange of knowledge, and Pearson's legacy was part of civil engineering's wider legacy of technological advancement and progress.

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The portfolio and presentational albums examined in this chapter are representative of the complex issues surrounding photographic production, circulation, consumption, and dissemination in the context of business collections. The albums discussed in this chapter's case studies highlight many of the material challenges faced when engaging with a photographic collection of the breadth of Pearson's. By paying close attention to the material and visual qualities of Albums Q39, Q40 (portfolio albums), Album Q36 'Sennar dam and Gezira irrigation works' (presentational album) and the copy of Album Q36 at the Institution of Civil Engineers, I have shown how both types of albums appealed to, and were created for national and international constituencies, external to Pearson. In section 6.1, I showed that the portfolio album type was a carefully crafted album which communicated a corporate vision of excellence, skil,l and global reach to external constituents. The inclusion of photographs taken by commercial photographers, simple design and layout of the albums meant that the portfolio album was seen as a marketing tool similar way that an industrial catalogue. By showing photographic views of global infrastructure in the company's business portfolio, and photographs of the

company head office and director, the albums communicated a message certainty, of everything going to plan. The exclusion of construction disasters, further evidences this point.

Section 6.2 followed on from the portfolio album to the presentational album Q36. Created to present to esteemed colleagues and clients, Album Q36 was a compilation of highlights of the construction of the Sennar dam and irrigation works in Sudan. Presenting copies of this type of album to the company's wider networks could be seen as a gesture of corporate diplomacy, a token of appreciation, and a material reminder of Pearson's legacy. As Martha Langford has noted: 'all compilers appeal to the future'—a point not relevant to progress albums, but very pertinent to presentational albums.[22] Indeed, copies of Album Q36 in national and international repositories denotes not only the various networks of circulation in which photographic materials was circulated and consumed, but equally, the deposit of the copies of Album Q36 in cultural and educational repositories ensured Pearson's legacy was saved for posterity. Networks are of course a crucial element of understanding how Pearson's corporate image through the medium of photographic albums were circulated and consumed.

[22] Langford, *Suspended Conversations*.

Chapter 7: Conclusion

This study of S. Pearson & Son's photographic albums has engaged with that firm's photographic archive as a whole—its texts, images, and objects. In so doing, it has answered specific questions concerned with the ways photographic materials—and, in particular, photographic albums—were produced, circulated, and used within and beyond that company. This thesis has also advocated an alternative way to think about and engage with photographic collections informed by scholarship on historical geography, photographic history and history of technology. I have focused on the functions photography performed in a corporate context, and have shown how it served as a tool of communication that allowed the company to address different constituencies at different times, in different spaces of consumption, and with different purposes in mind. The thesis sheds light on both the technological functions of photography in the specific context of civil and industrial engineering and, more generally, on the development of photographic archives and their circulation between private and public spheres.

The Pearson collection, housed at the Science Museum, is a significant corporate archive. The result of fifty years of corporate record-keeping practices, it offers the historian a comprehensive visual record of industry and civil engineering. The collection's 138 photographic albums are representative of a sustained effort to construct a visual and material record of the company's operations, and they effectively demonstrate the company's scale and global reach. Moreover, the archive's social biography, particularly from the mid-1960s onward, offers an insight into the concerns and priorities of Pearson PLC concerning the material legacy that its photographic and business records constituted. The archival records' relocation from a private corporate space to a public-facing cultural institution in itself raises questions to do with the collection's accessibility and visibility today, and with how future digitisation might

open up the possibility of new intellectual and geographical interpretations of the collection, reflecting upon the global scale of the company's activities and legacies.

7.1 Summary of findings

The global scale of Pearson's engineering contracts and oil projects has been documented by historians who have paid close attention to the fundamental role Weetman Pearson (later Lord Cowdray) played in transforming the firm from a Bradford brick-laying concern in to a multi-national conglomerate.[1] Chapter 1 took into account the company's history of expansion and development in order to contextualise not only the origin of the archive and its importance, but also to situate Pearson in the wider landscape of nineteenth-century British engineering. Here, I introduced my main arguments: 1) that there are significant limitations in applying a 'canonical' model of interpretation to a corporate photographic collection; 2) that engineering as a visual profession was closely tied to photographic knowledge and practices in the nineteenth century; 3) that Pearson's albums can be understood to fit into three broad categories determined by their function; 4) that so-called 'progress albums' were used by Pearson as an internal method for visual reporting; and 5) that the company applied photography as an external signifier of excellence and global ambition.

As a relatively understudied field in photographic history, histories of the uses of photography in industry in the nineteenth and twentieth centuries have typically adopted methodologies characterised by what I have termed a 'canonical' approach—focusing

[1] Garner, *British Lions;* Middlemas *The Master Builders;* Spender, *Weetman Pearson;* Lisa Bud-Frierman, Andrew Godley, and Judith Wale, "Weetman Pearson in Mexico"; Jonathan C. Brown and Alan Knight, *The Mexican Petroleum*.

on the role of well-known photographers and their oeuvre.[2] Although this type of approach is relevant where the role or oeuvre of a particular photographer is a central issue, in the context of corporate photography, where the identity of photographers was often not recorded, and when engineers themselves took photographs, the importance of the individual photographer and their work is less central. In Chapter 2, I argued that an approach that engages with photography and its materiality is, arguably, a more productive way of working with collections where photographic authorship is uncertain. By focusing on the material qualities of the collection—the quality of the albums used, the type of photographic processes employed, the annotations of album pages and prints, the size and scale of albums, and so on—I have been able to interpret the Pearson collection in relation to the functions it served, and, in a broader sense, the networks within photographic materials circulated and were consumed. Applying this methodology necessitated a systematic and meticulous survey of the collection at the level of the individual album page, and the detailed recording of material qualities and evidence that offered insights into questions of production, use, and circulation.

In this context, Deborah Poole's concept of visual economy was useful in pinpointing some of the theoretical concerns around photographic circulation. Questions of circulation and consumption of photographic records and albums informed my approach to the collection. In surveying the material qualities of the photographic albums, I outlined a typology of albums according to their function, identifying them, variously, as progress, presentational, or portfolio albums. The material qualities of each of these album types are distinct. Progress albums, for instance, were produced by Pearson staff in the drawing department and featured a chronological narrative of construction progress assembled from photographs sent from construction sites across the world to

[2] Brown, *The Corporate Eye;* Chrimes, *Civil Engineering.*

the company's head office in London. This centralised reporting allowed for a visual record to circulate internally within the company, enabling senior management to simultaneously manage various (and often globally dispersed) contracts from one place—photographs, in that respect, allowed the firm to function as a global enterprise from a single metropolitan centre. The circulation of photographs enabled Pearson to deal with the problem of distance by allowing the firm's managers to, in effect, be in two places at once and to manage operations more effectively across space and time as a result.

Presentational albums offered the viewer a sophisticated visual and material narrative of the construction of infrastructure. Presented to clients, dignitaries, and guests, this type of album served a social as much as instructional function; by distilling the highlights of a construction project into a short photographic series, these albums were objects of admiration used to develop and cement social relationships. Portfolio albums served a similar function, but presented the viewer with a series of photographs of a number of different contracts that were deigned to project a corporate image of Pearson's global scale, prestige, and technical skill. Presentational and portfolio albums shared material qualities in that photographs in these albums were taken by commercial photographers working on site, unlike the progress albums that typically featured photographs taken by photographically trained engineers. The research undertaken in distinguishing the qualities of these album types, and in proposing the categories I have, has been important in my analysis of the firm's varied use of photography: as a means of monitoring its operations, as a tool with which to secure social relationships, and as a mechanism to create and sustain a corporate image. In adopting this approach, I have been able to shed light on the functions of the collection as a corporate archive, rather than focusing solely on the oeuvre or aesthetics of the collection. Engaging with the

collection with questions of materiality to the fore has offered important insights into the company's history and operations more generally—it has shown that photography was central to all that the firm did and aspired to do. Pearson, simply put, was defined by photography.

In researching the collection, I was struck by the quantity of photographs taken by engineers. In order to understand the visual economy in which Pearson and its staff operated, it was necessary to contextualise the use of photography in the engineering profession more widely. Chapter 3 sought to provide an overview of that relationship, focusing, in particular, on the engineering profession as a visual enterprise—one reliant on maps, blueprints, photographs, and drawings to communicate complex ideas to expert and non-expert audiences alike. In Chapter 3, I showed that early nineteenth-century albums of drawings and watercolours depicting the construction of infrastructure (such as railways), set a visual and narrative tone for how photography might depict construction progress. The adoption of similar visual framings, aesthetics, narrative organisation, and the inclusion of introductory texts (a key feature of presentational albums), are characteristics of industrial photographic albums. The relationship between engineers and photographers is, equally, an important aspect of understanding the types of commissions and work available to photographers. The inclusion of disciplinary subjects such as technical drawing, painting, and chemistry in the training of engineers meant that, theoretically at least, engineers had the theoretical background and knowledge to be able to compose an image and process a photographic negative. Other sites of notable connections and affiliations between the disciplines of photography and engineering include those engineering journals that published photographs taken by engineers.

Progress albums, in a way, exemplify the relationship between photography and engineering. The inclusion of photographs taken by engineers is a practical example of how engineers were actively engaging with photography as a tool to depict—for senior management in London—technical aspects of construction. Although photographs taken by commercial photographers were also included in this album type, the majority of the photographs in progress albums were taken by Pearson engineers, or, in the case of infrastructure surveys, taken by consulting engineers. The purpose of this type of album was to report progress during a specific phase of the construction of any given infrastructure project or oil exploration with which Pearson was involved. In Chapter 5, I showed how the company used this type of album for internal reporting and for project management. For a company whose scale of geographical operation was global, photography allowed Pearson centrally to visualise and analyse progress made on any of its contracts, irrespective of where in the world they were. Assembled by staff in the drawing department, the progress albums present the viewer with neat, hand-written indexes, captions, and comments. Pencil annotations on album pages referring to copies of photographs sent to the client, or referring to copies of a particular photograph in another album, denote the work-in-progress nature of these albums; in some senses, these albums were in a constant state of becoming—they were not fixed and stable but evolved and changed as the project they documented developed and as photographs were entered, removed, and returned. The progress album was an effective way to report directly from the construction site to the firm's head office, but it was also an informal memorandum used to communicate internally between various members of staff. Progress albums also demonstrate and record the scale of human labour involved in designing and executing album layouts, headers, and captions; the remnants of pencil-marked grids in some pages evidence the care and attention to detail that went into

producing this type of album. The craft and labour which went into each of Pearson's albums is revealed through an attention to their material qualities.

Unlike presentational and portfolio albums, progress albums were inherently *inward* facing. A channel for internal reporting and communication, the progress album was—in its material sense—significantly less sophisticated in comparison to the presentation and portfolio albums. My analysis of the condition of the paper in progress albums (particularly in comparison to progress albums) shows that this type of album was likely to been acquired in large quantities, unlike presentation and portfolio albums which were produced externally at a more sophisticated and higher-quality level. *Outward*-facing albums take on a different function from the progress album—where progress was documented. Here, a corporate image of excellence, technical skill, and knowledge was promoted through the selection of particular types of image and through the context of their display—minimal captions mimicking business card ('S. Pearson & Son, contractors'), consistency in the sizing of photographs in the albums, inclusion of images taken from vantage point to allow the viewer to understand the scale of the construction site, and the inclusion of photographs of the company's head office, and its director, Lord Cowdray denoting the company's prestige and global reach.

Presentational albums, the most refined of the three album types I have identified, presented the viewer with simple, yet high-quality gold trimmings, large photographic prints, chronological narrative, and introductory texts to set the project in its historical and economic context. Offered to clients, guests, and work associates, the presentational album took on social currency not only as an object reflecting shared memories of the construction of a particular infrastructure, but also as an object of esteem and worth. The circulation of this type of album was external—a fact evidenced by the preservation

of copies of these albums in various national and international archives, such as the British Library and the Institution of Civil Engineers. Portfolio albums were compiled from photographs used in presentational albums, but in this type of album, the focus of the narrative was on presenting a small range of photographs from high profile contracts, thereby promoting a consistent professional vision of engineering proficiency. Portfolio albums communicated to an external audience of potential clients, showcasing some of Pearson's most-celebrated infrastructure projects, such as the Admiralty Harbour in Dover and the dry docks in Malta. Both types of albums presented viewers with a curated vision of the firm, designed to place it in the most favourable light and, in so doing, to secure its future business interests. In analysing these albums with respect to their materiality, I have been able to draw out characteristics that shed light on the internal and external uses of the firm's photographic archive.

7.2 Summary of contribution

Based on substantial original research on the Pearson collection, this thesis has sought to make a wider contribution to the intersecting fields of photographic history and historical geography in a number of respects. Firstly, it has provided an example of how complex photographic archives can be approached, interacted with, and understood through the specific methodologies and research design it has employed. Secondly, existing scholarly thinking about corporate photographic archives and industrial photography has been challenged. While the gap in literature on corporate archives and industrial photography is significant, I was interested in examining the collection from a *holistic* perspective, taking into account a wide range of material evidence to build a different understanding of this collection and its albums, but also its significance for photographic historians, historians of technology, and historical geographers. Building

upon the work of, among others, Felix Driver, Miles Ogborn, James R. Ryan, and Joan M. Schwartz, I have sought to make an original contribution to our understanding of the economy of visual knowledge through a focused examination of the photographic album form and its epistemological value in relation to the engineering industry. This thesis has sought to shed light on how photographic archives created in corporate spaces can be interrogated and understood. By placing the material object—the photographic album—at the centre of my focus, I have been able to move beyond the apparent problem of a lack of information as to the identities of the contributing photographers, and to ask different questions about the function of photography and albums within the firm more generally. Some questions have, however, remained unanswered. I have not, for example, been able on the basis of surviving records to interrogate fully the financial costs associated with the production of this photographic archive—the costs of albums and photographic reproductions, the sourcing of commercial photographers, the labour of Pearson staff in the production process. A second unanswered question concerns the scale of external circulation of Pearson albums. While copies of progress albums exist in The National Archives, and copies of presentational albums exist in The British Library, the Fine Art Library in Harvard, and the Institute of Civil Engineers, among others, which other public or private intuitions or individuals may have at one time held copies of these albums? The trajectory of certain albums beyond the company is clear; the trajectory of others remains a mystery.

What I hope to have shown is that gaps in the archive—in this case, over the identity of the photographer involved in the production of images, or the cost associated with producing an archive of this scale—need not be an obstacle to the interrogation of photographic albums and that, indeed, such absences can provide an important prompt to thinking in different ways about the material under examination. In several senses,

then, this thesis has been a more-than-textual study; one that has looked beyond the written word for evidence that might explain the varied ways in which photography supported and defined the corporate activities of Pearson.

In designing this project I was conscious of the need to avoid simply reiterating hagiographic accounts of the firm's history and the achievements of its director, Lord Cowdray. My focus was, instead, more critical and focused on what I understood to be the primary function of the corporate archive: to keep accurate records of the business' transactions, construction plans, correspondence (internal and external), and photographic records. By turning my attention away from management head figures, I was able to focus on an understudied element of the firm's history and, in so doing, to reveal previously unconsidered elements of its operation. A similar point can be made, more generally, in relation to industrial photography and the canonical approach often applied in this area of photographic history. Existing studies of industrial photography in the UK have tended to focus primarily on photographic depictions of the canon of engineering: the Forth Bridge in Scotland and the construction of the SS *Great Eastern*, for instance.[3] Contextual information on well-known infrastructure is abundant, yet there is apparently little concern in understanding the wider uses and functions of these photographic records. While there is clearly value in studying the oeuvre of Robert Howlett (author of the iconic photograph of Brunel against the chains of the SS *Great Eastern*), it is equally important to understand how such photographs functioned, were produced, and circulated.

[3] Davies and Collier, *Industrial Image*; Chrimes. *Civil Engineering.*

7.3 Review and prospect

The design of this study, and the methodologies employed, were intended to contribute to a wider set of scholarly discussions about the interrogation of photographic collections.[4] Informed by three research questions—1) what were the functions of the photographic collection?; 2) how was the collection produced, circulated, and used?; and 3) what are the themes of the collection? And, how do these themes inform the company's engagement with photography?—I surveyed the firm's photographic archive with a view to understanding its function, assemblage, and purpose. In surveying the albums, it was evident that Pearson used photography, and photographic albums, as a tool to communicate, report, project-manage, and visualise its various contracts across time and space. While it is evident that some of the firm's albums were assembled by staff in Pearson's drawing department—those who had the technical skills and the drawing equipment necessary to design and assemble progress albums—it is also apparent that the portfolio and presentational albums were not produced in house; their highly sophisticated appearance and streamlined contents indicate professional assembly. In relation to circulation, the survival of copies of albums beyond the Science Museum's collection evidences the scale exchange between the firm and its clients and work associates. Through a comprehensive survey of the albums, and their 13,000 photographs, I was also able identify connected discursive themes: progress, corporate image, engineering and technical knowledge, and legacy.

While I focused primarily on contrasting approaches—canonical and material—these methodologies are not mutually exclusive. It is possible to approach a collection both by

[4] Edwards and Morton, *Photographs, Museums, Collections;* Solomon-Godeau, *Photography at the Dock*; Schwartz,"Materiality".

looking at its place within the canon *and* by focusing on the material qualities of the photographic objects studied. Other ways of interpreting the Pearson collection could, likewise, involve looking at how the collection was used by Pearson in the aftermath of Lord Cowdray's death in 1932, shortly after which the civil engineering department was terminated, leading the company to focus on media and education. How was the corporate archive—an immobile collection of visual company records—engaged with after that point? Approaching the collection from this perspective could provide fascinating insights into how staff engaged with the albums and for what purposes. Correspondence related to a series of missing albums between the museum and Pearson PLC show that Pearson employees (as well as members of the public) had access to these albums, and consulted them regularly.[5] This type of *ad-hoc* access raises interesting questions over storage, access, conservation, and understanding of the archive's value to the company and its staff. While the transfer to a new office space, and a desire to offer members of the public wider access to the collection, were the main reasons behind the collection's relocation to the Science Museum, a study of the collection's usage between 1930 and 1970 would shed more light on the uses of corporate archives more generally.

A second productive approach could come from an attention to questions of conservation. Throughout my research, I was interested in understanding more about conservation. In particular, I was interested in how the disciplinary perspectives of conservation might contribute to a fuller understanding of the photographic materials. Not only in relation to current conservation issues and future conservation needs, but also by using conservation as a scientific tool it could be possible to understand the qualities of the materials used in the 'fabric' of the albums used in the production of this

[5] Sc.L.G 171/821. S. Pearson & Son Accession File

archive. While brittle page edges and page discolouration can be attributed to storage conditions and/ or usage, knowledge of the material and chemical conditions of the types of commercial albums in the collection might provide information that would allow one to determine where the albums were bought and the costs involved, and thereby contribute to understanding the market for photographic albums produced in corporate contexts. This approach is relevant to both 'off-the-shelf' progress albums discussed in Chapter 5 and bespoke presentational and portfolio albums in Chapter 6. The disadvantage of this type of approach is the complexities and costs of conservation testing at such a large scale. While the Pearson photographic collection (138 albums) is relatively small in comparison to larger collections, a partial solution to this problem would involve analysing a sample of albums.

Digital access on the other hand, could be a way to support international researchers in accessing the Pearson albums. While there are, at present, no specific plans to digitise the collection, digitisation should not be viewed as the only solution to support access to the collection. Financial and staffing resources dictate the pace at which digitising is possible. Moreover, in the case of the Pearson collection, the number of albums presents challenges in digitisation, as this process is likely to be lengthy and costly to execute, store, and display. Internal priorities in terms of which objects are digitised and for what reasons and audiences are likewise a hurdle most photographic collections encounter, as Elizabeth Edwards and Chris Norton have outlined.[6]

Equally, digitisation cannot, in itself, be seen as a single solution to issues of how collections are accessed remotely. Indeed, as Joanna Sassoon has argued, the following

[6] Edwards and Morton, *Photographs, Museums, Collections*

factors should be taken into consideration.[7] Firstly, the balance when engaging with the photograph as both a cultural and technological object should be maintained. Secondly, the material qualities of a photograph. As Elizabeth Edwards, Janice Hart, and Joan Schwartz have noted, photographs are complex objects containing layers of material choices ranging from photographic process, to the type of paper, to annotations on the back of the photograph. These layers are important and should be accessible to anyone engaging with photographs.[8] And, thirdly, the relationship between the photograph and its digital copy should be taken into consideration. Joan M. Schwartz argues that photographic meaning is framed by the very institutions whose collections include photographs. Expertise, staff academic backgrounds, and institutional priorities and strategies mean that photographic collections tend to be treated differently from institution to institution. And, in making the case for digitisation, many institutions will consider the general needs of the audiences who ultimately will engage, access and eventually purchase a digital copies from their collections. Particularly in the case of photographic albums, attention to the material qualities of photographic albums as a photographic object are usually superseded by the perceived needs of the audience, that is, most consumers are more interested in the photographic print. More often than not photographic album pages are not fully digitised, presenting the viewer a cropped version of the album page. Moreover, as Sassoon, and Joan M. Schwartz have noted, seeing a digital copy of a photograph is 'viewing the visual surface of an image', where the layers of material qualities are compressed to be optimised for web viewing.[9] Instead, photographic meaning should be seen the sum of a wider set of factors (most of which have been present and discussed in this thesis): social function, circulation,

[7] Joanna Sassoon, "Photographic Materiality in the Age of Digital Reproduction" in *Photographs Objects Histories*, eds. Edwards and Hart, 186.
[8] Edwards and Hart, *Photographs Objects Histories*.
[9] Sassoon, "Photographic Materiality", 190.

exchange, storage and access.[10] Digitisation, therefore, presents significant problems when dealing with a photographic archive as rich as the Pearson collection. Such an undertaking would require, at the very least, a well-thought-through digitisation strategy—one designed to ensure the integrity of the albums' visual narrative, and material qualities, and to develop an interface that would facilitate the viewer's engagement with the albums as objects in their own right. To do this, ensuring the albums are photographed in such a way as to include the whole page is vital. By prioritising the full layout of the album page, and by allowing the viewer to see what the album page looks like as a whole, what marks are on the page, or how brittle the page ends are, is vital for a systematic understanding of the album as a photographic object. Moreover, in the case of the Pearson collection (which is on long-term loan), an agreement to digitise and display the images online would have to be obtained from Pearson PLC. It is also likely that the company would have an influence on how the albums were digitised and displayed, an extra layer of institutional priorities and concerns to consider.

The primary objective of this research project was to understand the Pearson photographic collection, and to make sense of its 12,800 photographs arranged across 138 photographic albums. On one level, it can be argued that photography, and photographic albums, were simply a convenient way to produce and store visual corporate records of the company's fifty-year run as a global civil engineering and oil conglomerate. What this thesis has shown, however, is that photography played a role that went beyond merely record keeping; photography presented Pearson with a technology that allowed its staff and commissioned photographers to capture views of, and generate visions of, infrastructure—representations that meant different things to

[10] Schwartz, "Materiality", 1.

different audiences within the company and beyond. While there are clear visual and material differences between the three album types I have identified, long-distance communication, management by proxy, and circulation of knowledge are three functions that they shared. Progress albums shortened distances between construction sites and London, carefully curated portfolio albums framed Pearson's corporate image of engineering excellence and technological prestige, and presentational albums consolidated professional connections and 'preserved' Pearson's legacy within the various networks through which these albums circulated. Photography mattered to Pearson, and to the engineering industry in this period more generally, precisely because of its twin ability to capture 'reality' and to cultivate an imaginary.

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Engineering and the corporate photographic archive: a study of the albums of S. Pearson & Son, 1880-1930

Appendices A, B, C and D

Noeme Santana

Department of Geography
Royal Holloway, University of London
Submitted for the degree of PhD

Appendix A: Figures in Chapters 1, 2, 3, 5 and 6

Figure 1.1: Author's image, view of the Pearson collection at the Science Museum Archive, Wroughton, 2013

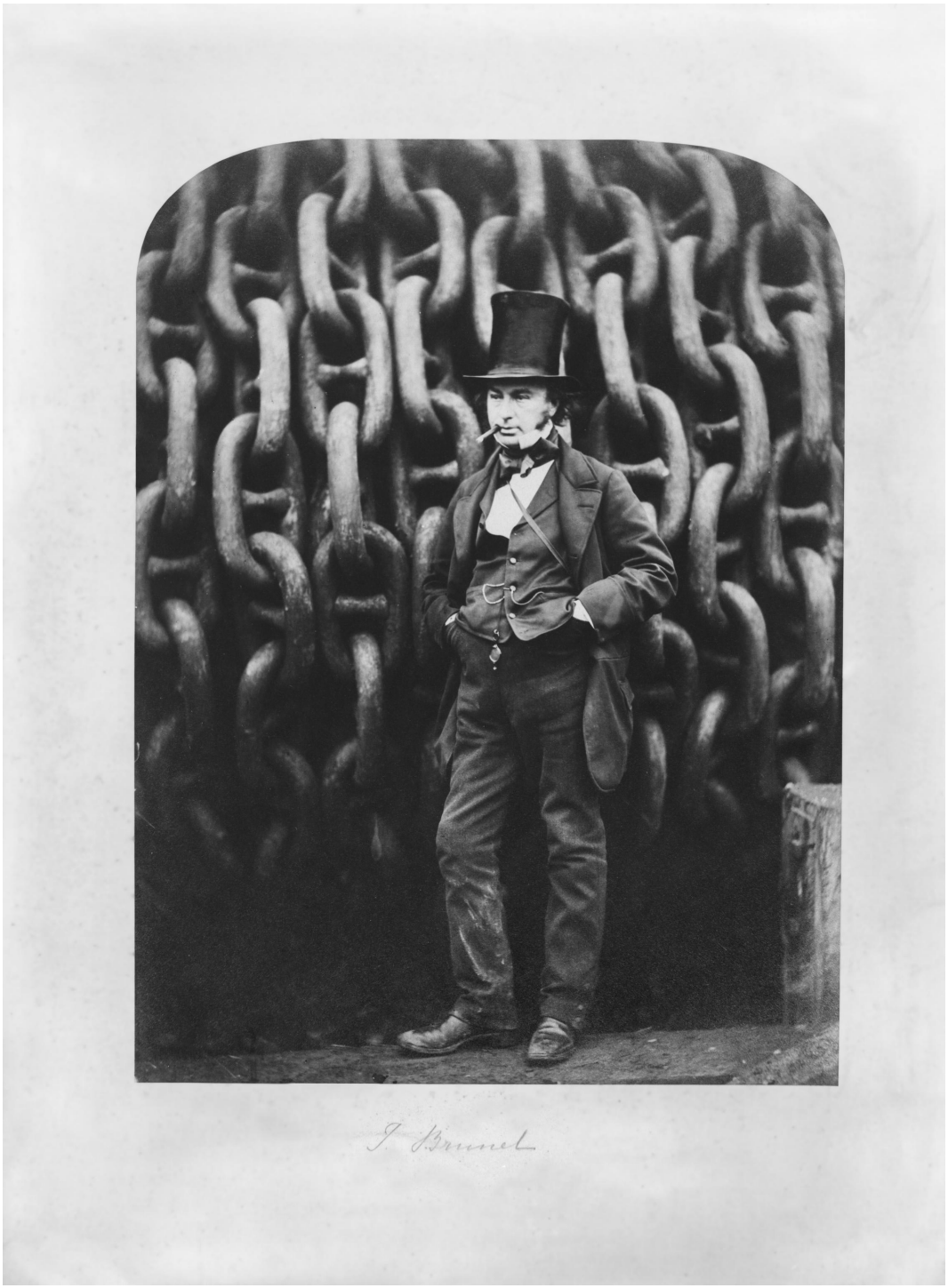


Figure 2.1: Robert Howlett,“Isambard Kingdom Brunel, 1857”

Figure 2.2: Evelyn Carey, “Cantilevers complete, 1889”

Figure 3.1: Unknown author, “The façade of the Royal Polytechnic Institution, showing Richard Beard’s photographic studio on the roof, 1843

Figure 3.2: John Cooke Bourne,"Tring Cutting, Hertfordhire, 17 June 1837"

Figure 3.3: John Cooke Bourne, “Great ventilating shaft, Kilsby Tunnel, Northamptonshire, 1838”

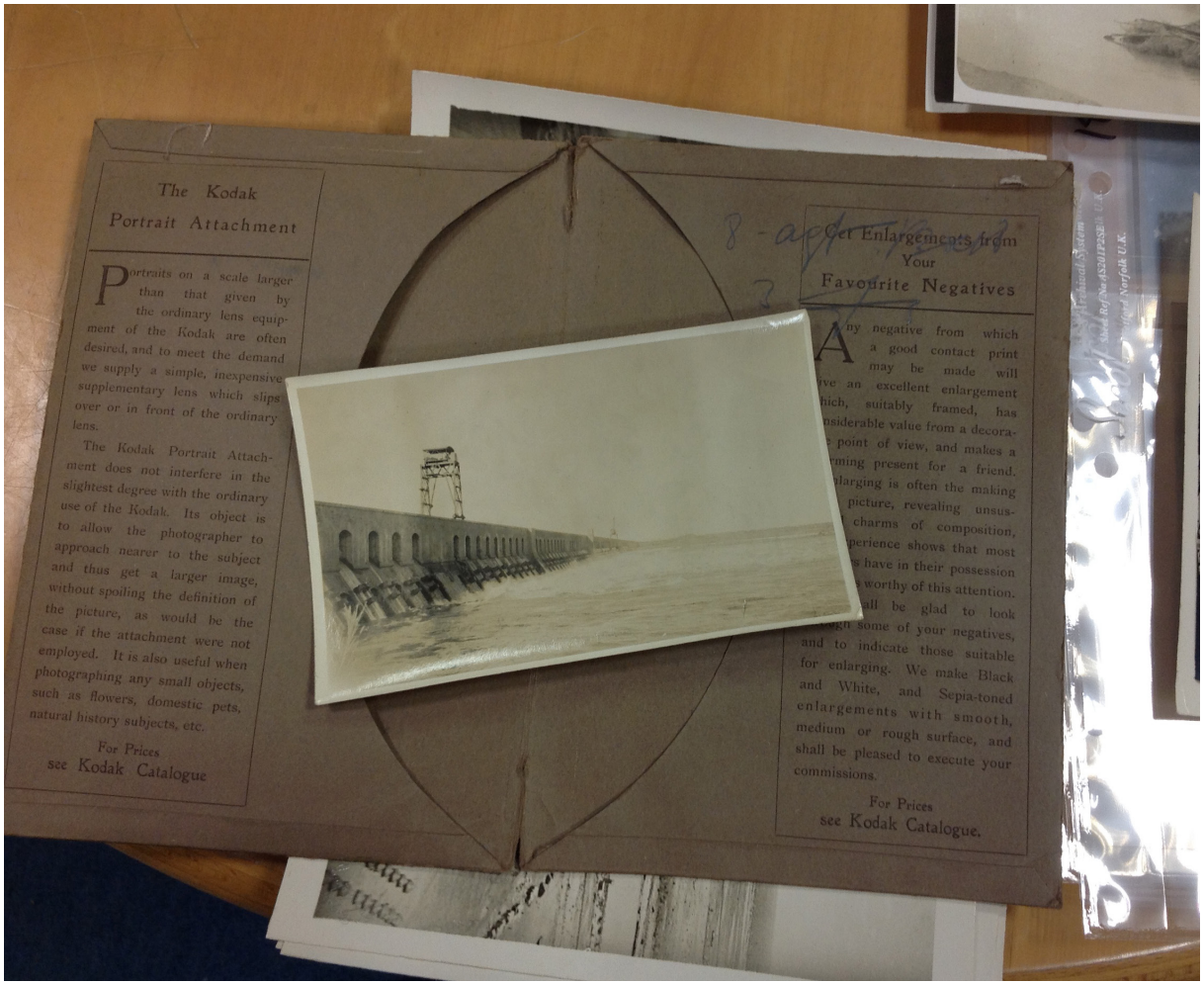


Figure 3.4: Author's image, Frederick Hopkinson's personal photographic archive, 2013

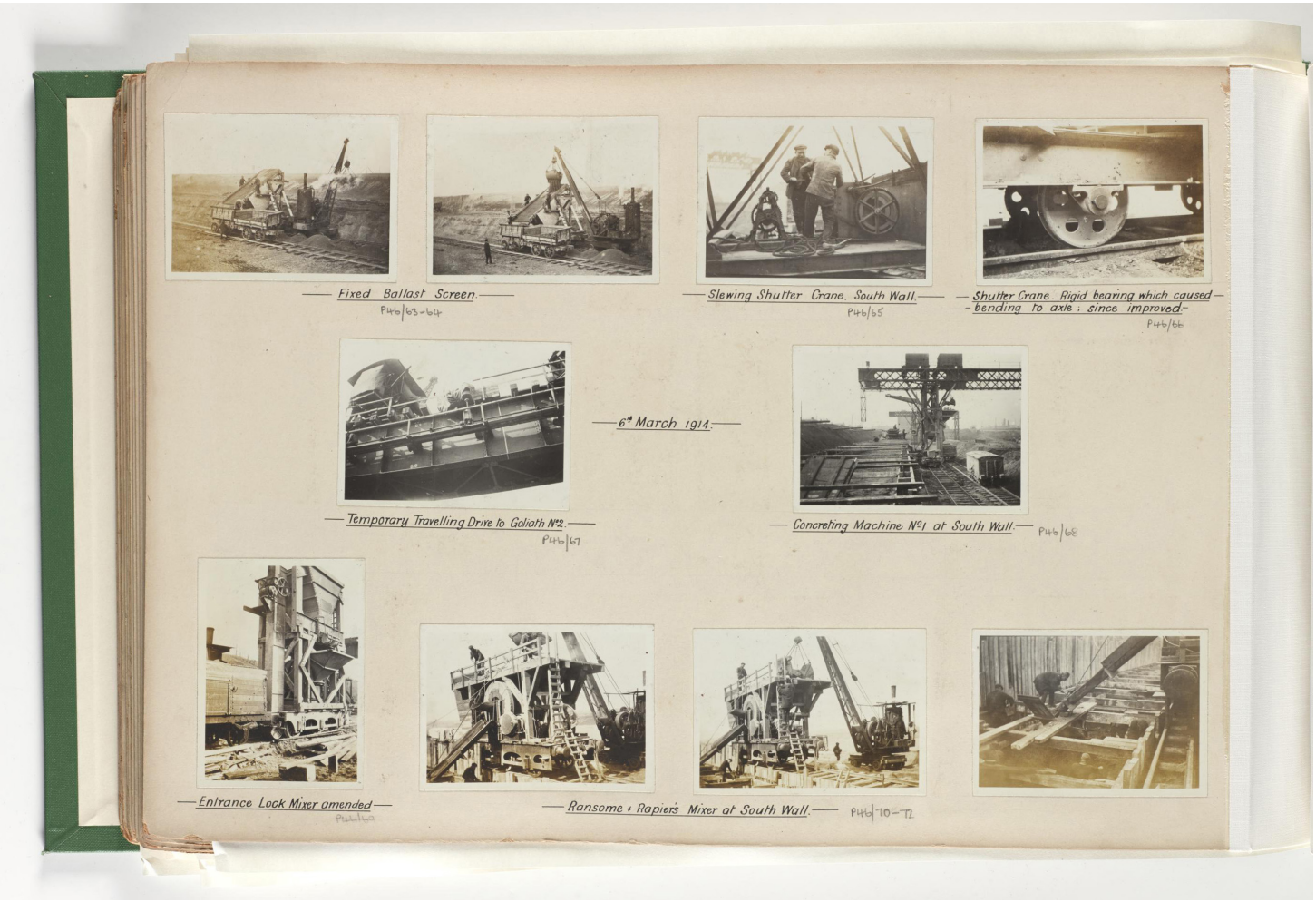


Figure 3.5: Unknown author, ten photographs depicting progress in the construction of the Royal Albert Dock, 1913-1915

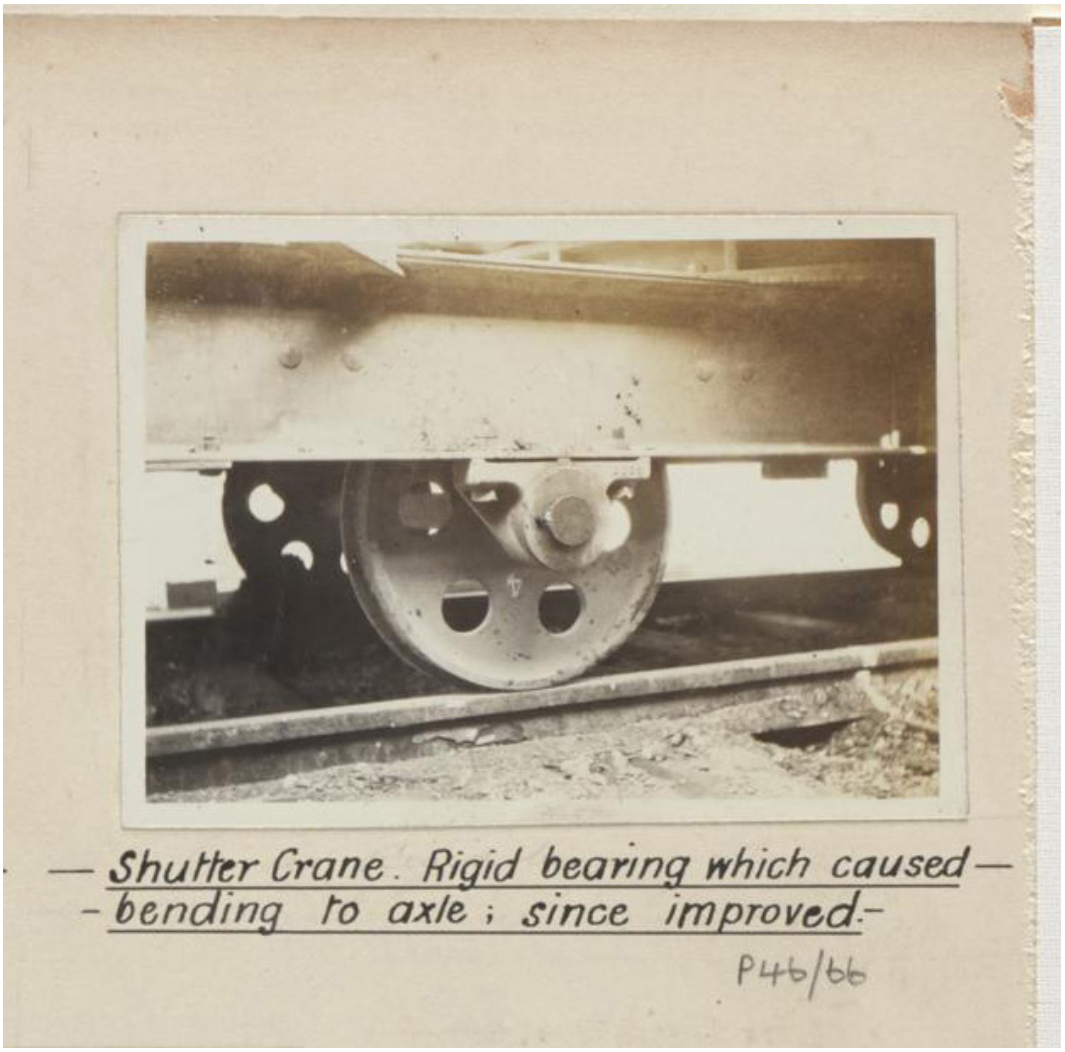


Figure 3.6 (detail from figure 3.5): Unknown author, “Shutter crane, rigid bearing which caused bending to axle; since improved”

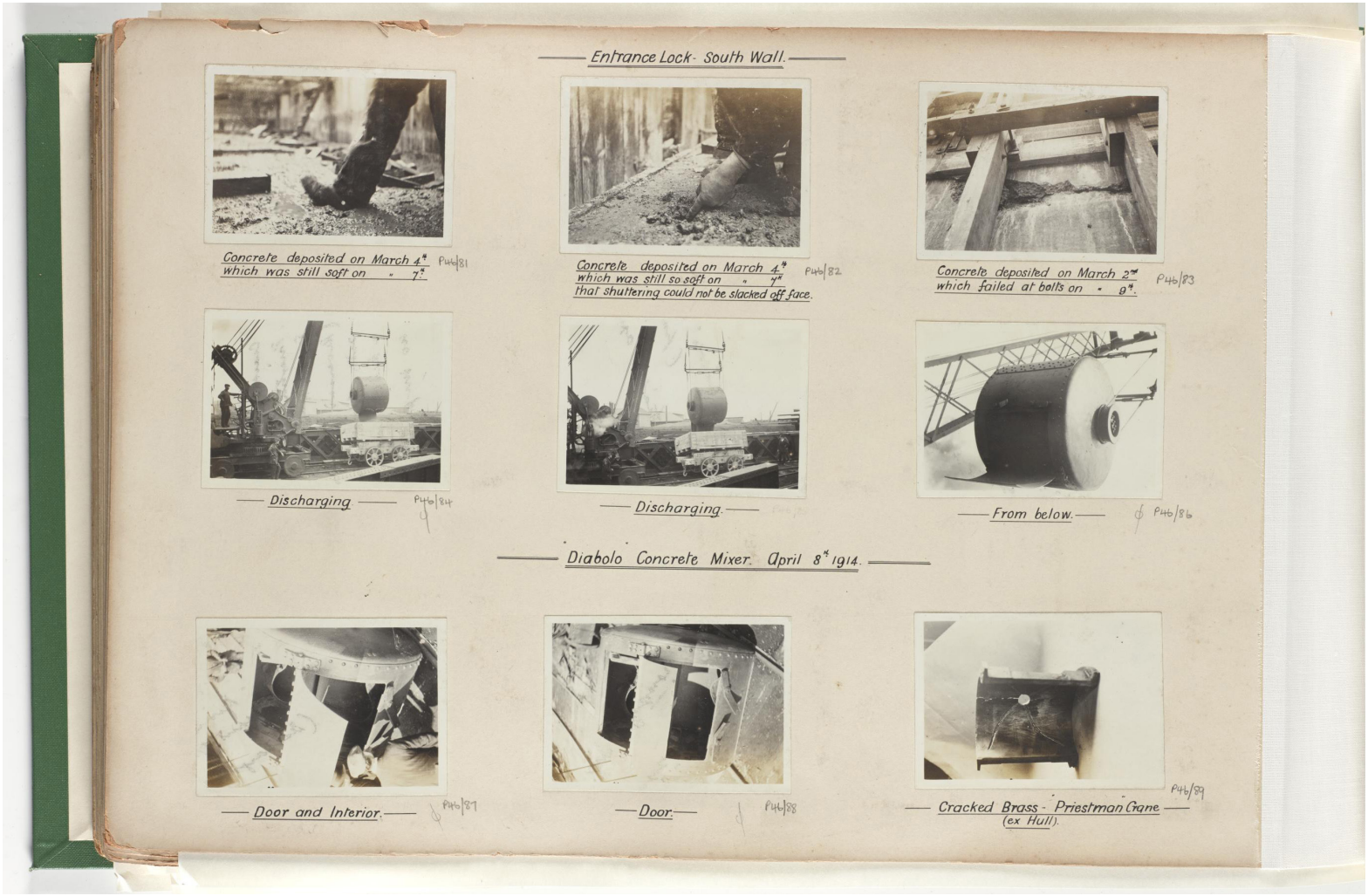


Figure 3.7: Unknown author, nine photographs depicting progress in the construction of the Royal Albert Dock 1913-1915

Figure 3.8 (detail from figure 3.7): Unknown author, "concrete deposited on March 4th which was still soft on March 7th"

Figure 3.9: Unknown author, six photographs depicting progress in the construction of the Royal Albert Dock, 1913-1915

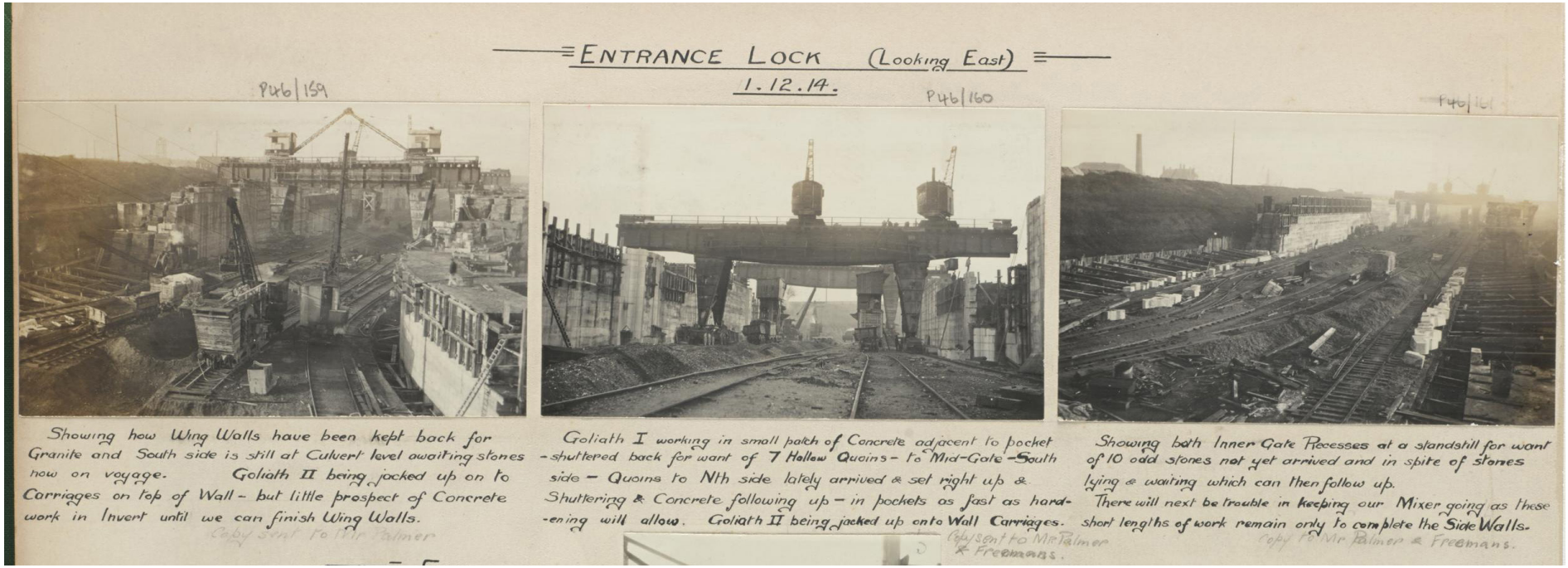
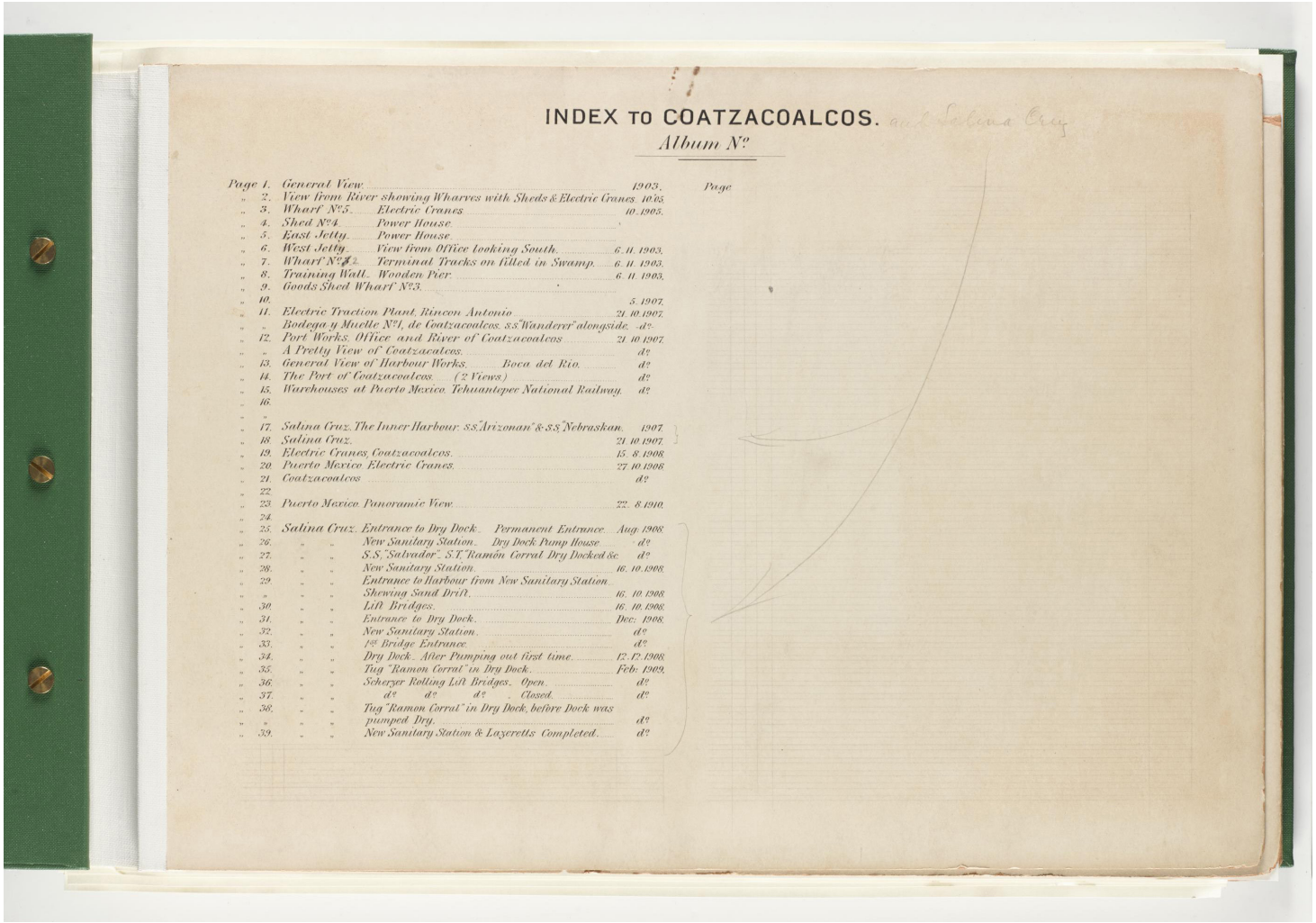


Figure 3.10 (detail from figure 3.9, third photograph from the right): Unknown author, “Showing inner gate recesses at a standstill”

Figure 3.11 Unknown author, “No 2 Tacna—Chupiquina”, 1914

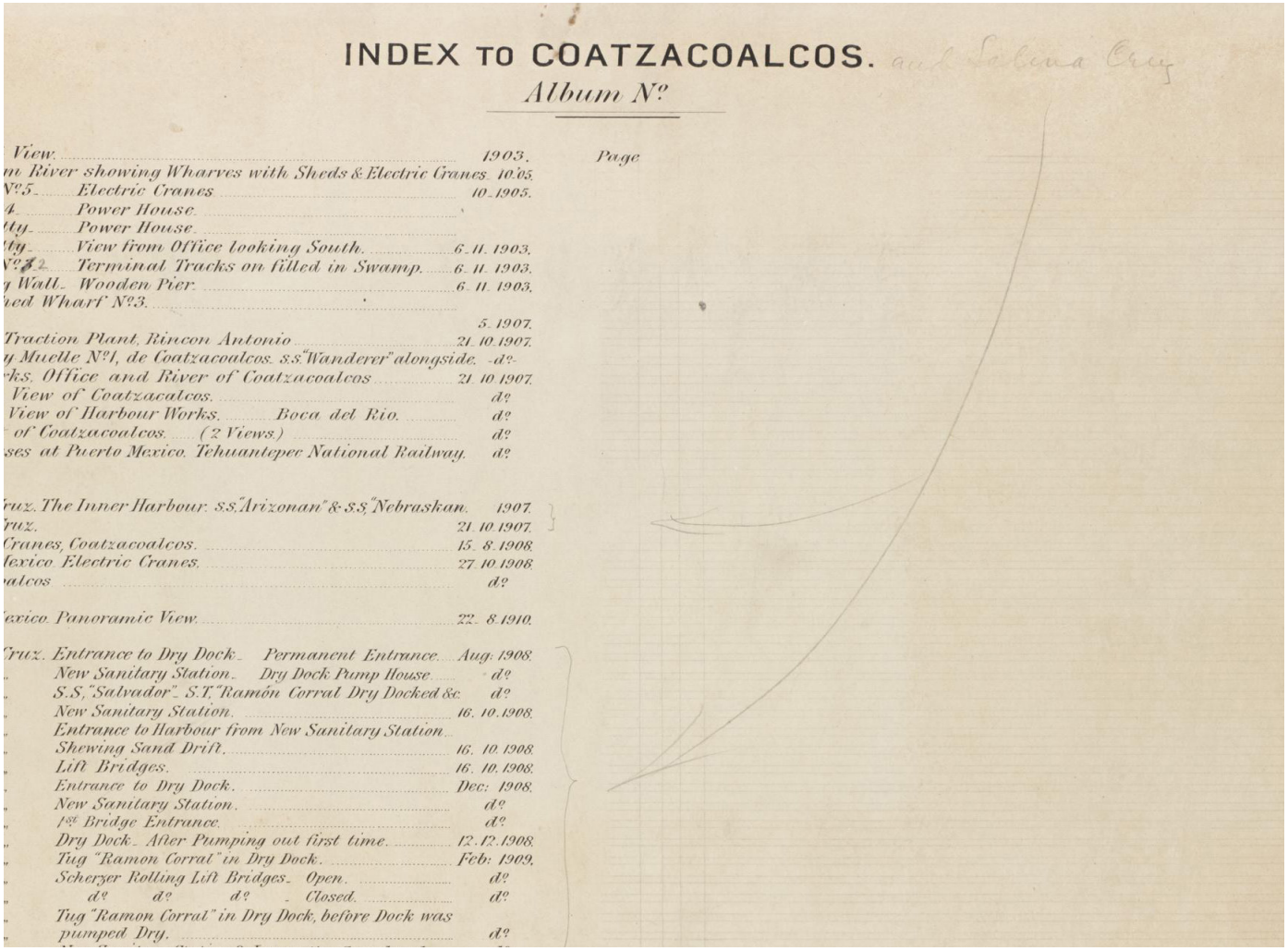


INDEX TO COATZACOALCOS. and Salina Cruz

Album N°

				Page
Page 1.	General View		1903.	
" 2.	View from River showing Wharves with Sheds & Electric Cranes		10.'05.	
" 3.	Wharf N°5.	Electric Cranes	10.1905.	
" 4.	Shed N°4	Power House		
" 5.	East Jetty	Power House		
" 6.	West Jetty	View from Office looking South	6. 11. 1903.	
" 7.	Wharf N°2.	Terminal Tracks on filled in Swamp	6. 11. 1903.	
" 8.	Training Wall.	Wooden Pier	6. 11. 1903.	
" 9.	Goods Shed Wharf N°3.			
" 10.			5. 1907.	
" 11.	Electric Traction Plant, Rincon Antonio		21. 10. 1907.	
" "	Bodega y Muelle N°1, de Coatzacoalcos. S.S "Wanderer" alongside.		d°	
" 12.	Port Works, Office and River of Coatzacoalcos		21. 10. 1907.	
" "	A Pretty View of Coatzacoalcos.		d°	
" 13.	General View of Harbour Works.	Boca del Rio.	d°	
" 14.	The Port of Coatzacoalcos.	(2 Views.)	d°	
" 15.	Warehouses at Puerto Mexico. Tehuantepec National Railway.		d°	
" 16.				
" "				
" 17.	Salina Cruz. The Inner Harbour. S.S "Arizonan" & S.S "Nebraskan."		1907.	
" 18.	Salina Cruz.		21. 10. 1907.	
" 19.	Electric Cranes, Coatzacoalcos.		15. 8. 1908.	
" 20.	Puerto Mexico. Electric Cranes.		27. 10. 1908.	
" 21.	Coatzacoalcos		d°	
" 22.				
" 23.	Puerto Mexico. Panoramic View.		22. 8. 1910.	
" 24.				
" 25.	Salina Cruz. Entrance to Dry Dock.	Permanent Entrance.	Aug. 1908.	
" 26.	" "	New Sanitary Station. Dry Dock Pump House.		d°
" 27.	" "	S.S. "Salvador". S.T. Ramón Corral. Dry Docked &c.		d°
" 28.	" "	New Sanitary Station.	16. 10. 1908.	
" 29.	" "	Entrance to Harbour from New Sanitary Station.		
" "	" "	Shewing Sand Drift.	16. 10. 1908.	
" 30.	" "	Lift Bridges.	16. 10. 1908.	
" 31.	" "	Entrance to Dry Dock.	Dec: 1908.	
" 32.	" "	New Sanitary Station.	d°	
" 33.	" "	1st Bridge Entrance.	d°	
" 34.	" "	Dry Dock. After Pumping out first time.	12. 12. 1908.	
" 35.	" "	Tug "Ramon Corral" in Dry Dock.	Feb: 1909.	
" 36.	" "	Scherzer Rolling Lift Bridges. Open.		d°
" 37.	" "	d° d° d° Closed.		d°
" 38.	" "	Tug "Ramon Corral" in Dry Dock, before Dock was pumped Dry.		d°
" 39.	" "	New Sanitary Station & Lazeretto Completed.		d°

Figure 5.1: Unknown author, “Index to Coatzacoalcos” 1903-1909



INDEX TO COATZACOALCOS.

Album Nº

		Page
View	*1903.*	
n River showing Wharves with Sheds & Electric Cranes	*10.05.*	
Nº5 Electric Cranes	*10-1905.*	
4 Power House		
dy Power House		
dy View from Office looking South.	*6-11-1903.*	
Nº3 Terminal Tracks on filled in Swamp.	*6-11-1903.*	
g Wall- Wooden Pier.	*6-11-1903.*	
ued Wharf Nº3.		
	5-1907.	
Traction Plant, Rincon Antonio	*21.10.1907.*	
y Muelle Nº1, de Coatzacoalcos. S.S."Wanderer" alongside.	*-dº-*	
ks. Office and River of Coatzacoalcos	*21.10.1907.*	
View of Coatzacalcos.	*dº*	
View of Harbour Works. Boca del Rio.	*dº*	
of Coatzacoalcos. (2 Views)	*dº*	
ses at Puerto Mexico. Tehuantepec National Railway.	*dº*	
ruz. The Inner Harbour. S.S."Arizonan" & S.S."Nebraskan.	*1907.*	
ruz.	*21.10.1907.*	
Cranes, Coatzacoalcos.	*15-8-1908.*	
lexico Electric Cranes.	*27.10.1908.*	
alcos	*dº*	
exico Panoramic View.	*22-8-1910.*	
ruz. Entrance to Dry Dock- Permanent Entrance.	*Aug: 1908.*	
New Sanitary Station- Dry Dock Pump House.	*dº*	
S.S."Salvador" S.T."Ramón Corral Dry Docked &c.	*dº*	
New Sanitary Station.	*16.10.1908.*	
Entrance to Harbour from New Sanitary Station.		
Shewing Sand Drift.	*16.10.1908.*	
Lift Bridges.	*16.10.1908.*	
Entrance to Dry Dock.	*Dec: 1908.*	
New Sanitary Station.	*dº*	
1st Bridge Entrance.	*dº*	
Dry Dock- After Pumping out first time.	*12.12.1908.*	
Tug "Ramon Corral" in Dry Dock.	*Feb: 1909.*	
Scherzer Rolling Lift Bridges- Open.	*dº*	
dº dº dº - Closed.	*dº*	
Tug "Ramon Corral" in Dry Dock, before Dock was pumped Dry.	*dº*	

Figure 5.2 (detail from figure 5.1): “Index to Coatzacoalcos”

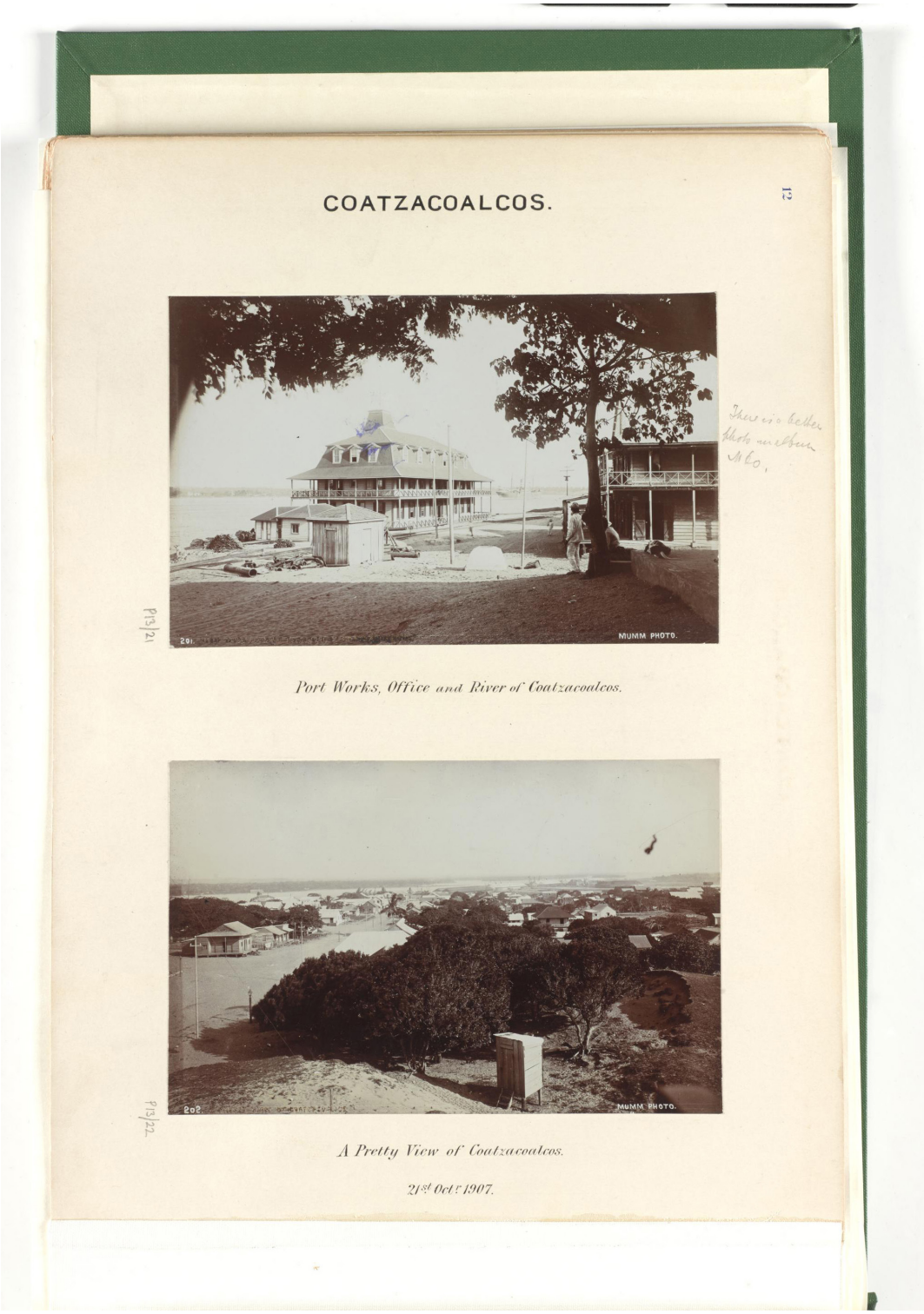


Figure 5.3: R. Mumm, two photographs depicting Pearson's office in Coatzacoalcos, and a general view of Coatzacoalcos, 1907

Figure 5.4 (detail from figure 5.3): R. Mumm, “Port works, office and river of Coatzacoalcos” 1907

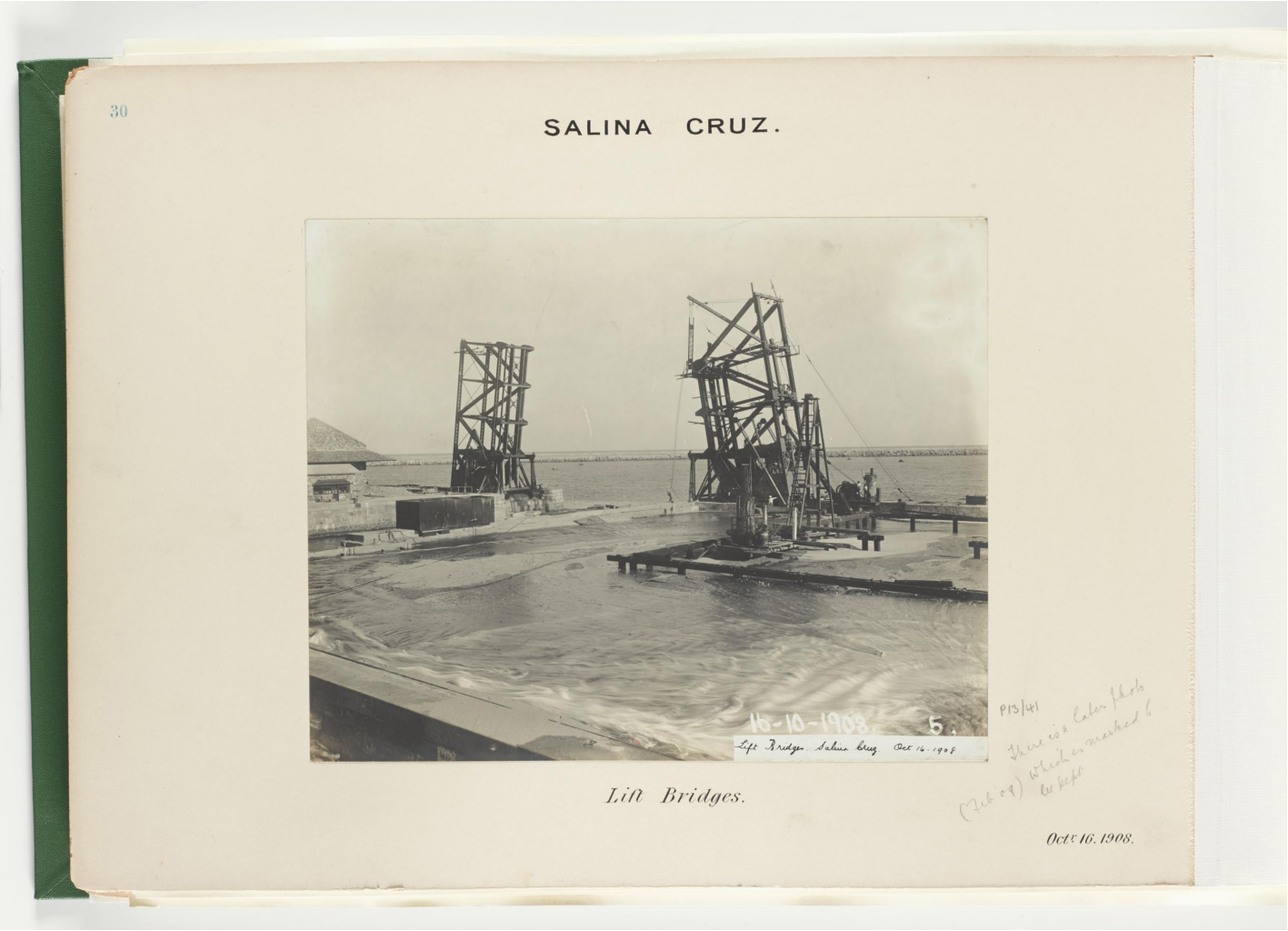


Figure 5.5: Unknown author,“Lift bridges” 1908

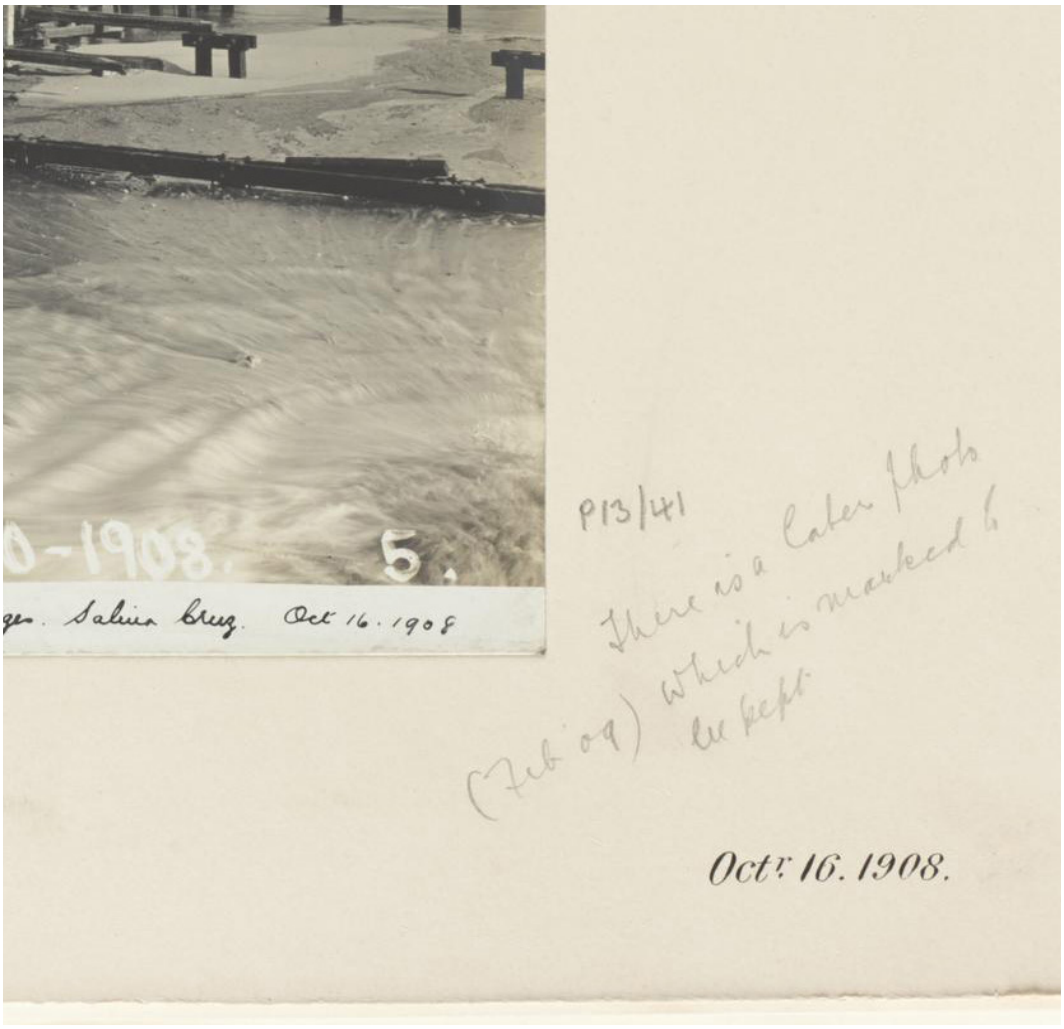


Figure 5.6 (detail from figure 5.5): Unknown author , “Lift bridges” 1908

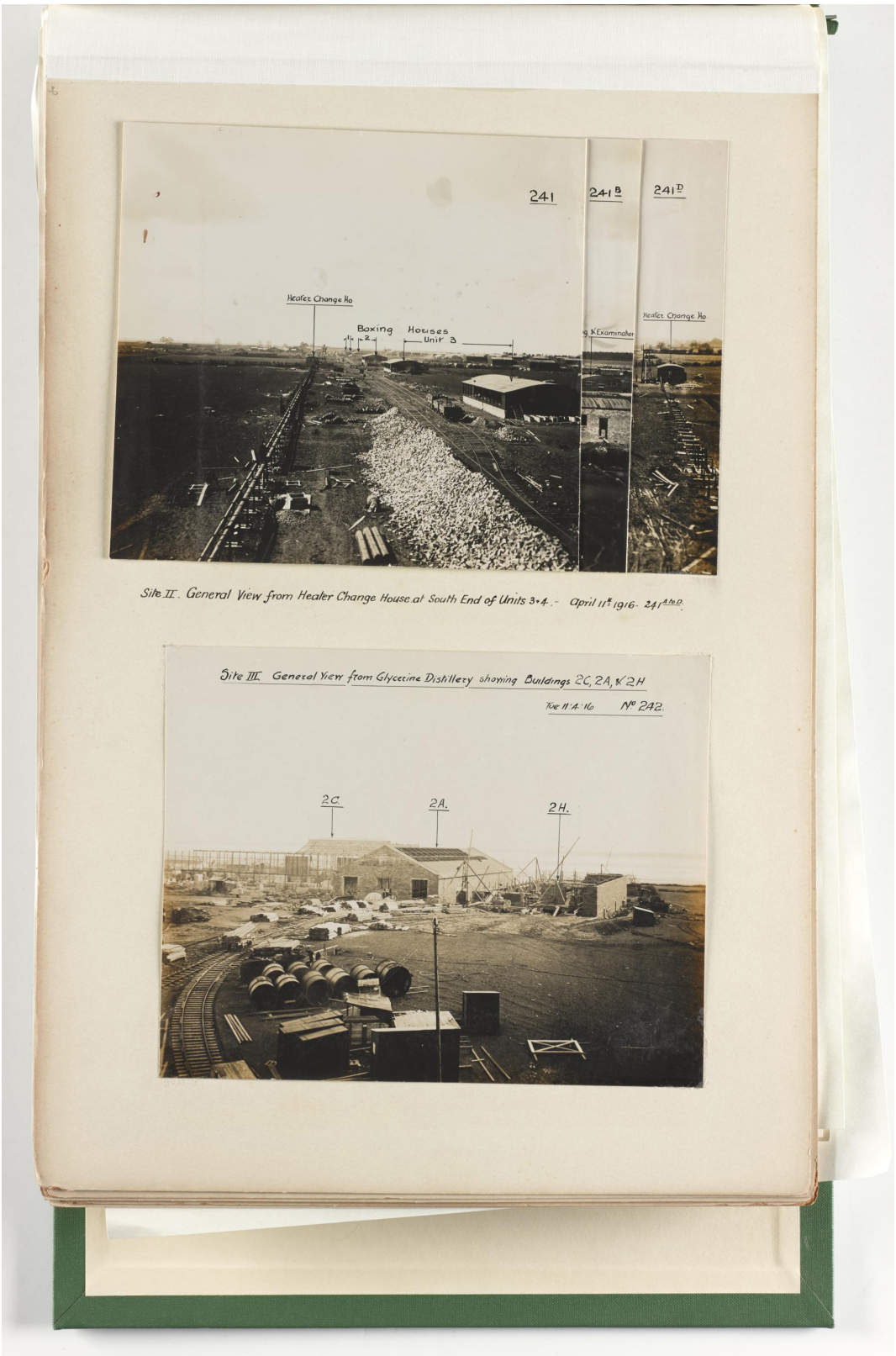


Figure 5.7: Unknown author, two photographs depicting sites II and III from: Album P76, Gretna III, 1916

Figure 5.8 (detail from figure 5.7): Unknown author “Site II General View from Heater Charge House ” 1916

Figure 5.9: Unknown author, two photographs depicting the interior of the Mossband facility, from: Album P79, Gretna VI, 1916-1918

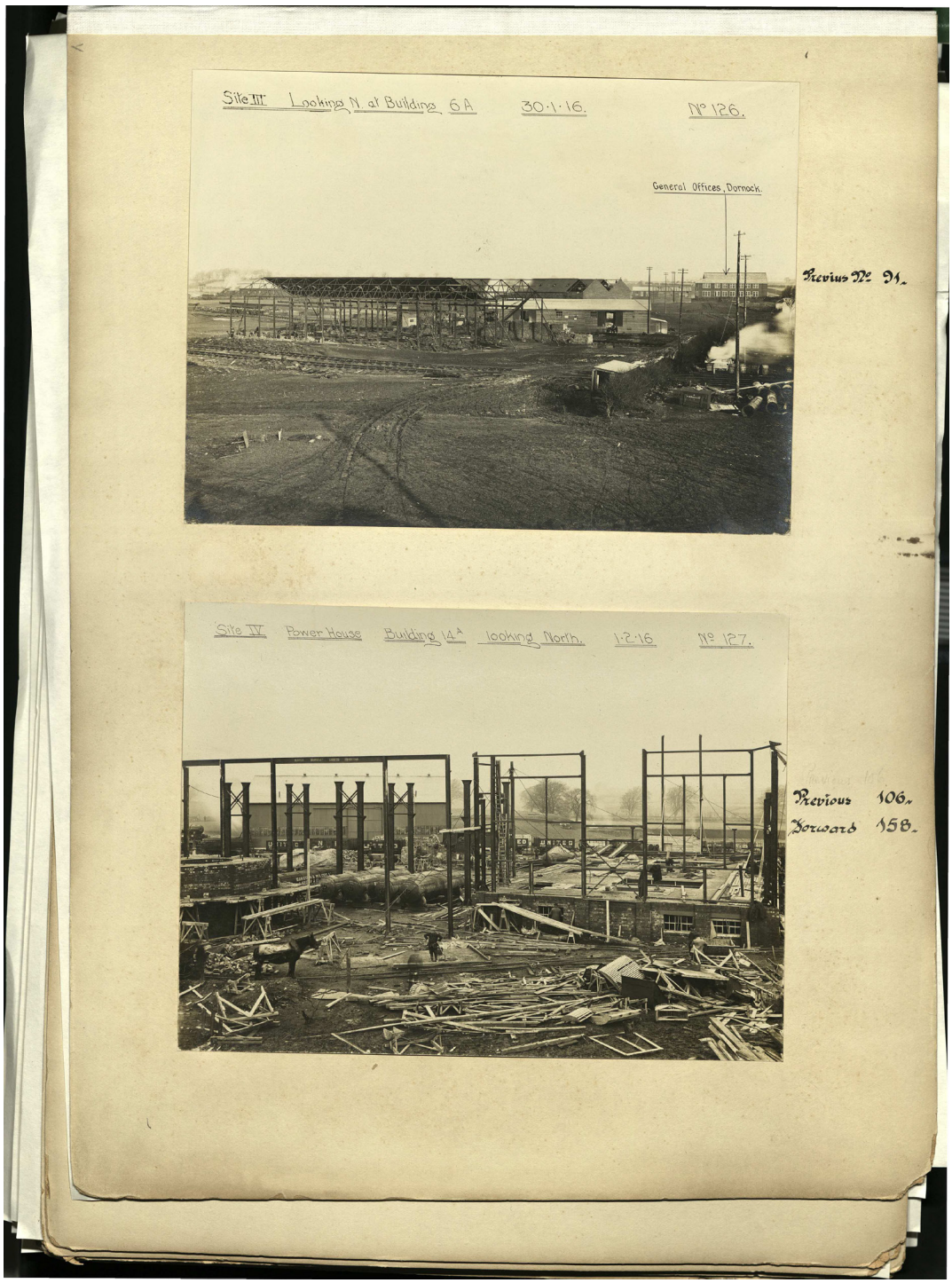


Figure 5.10: Unknown author, two photographs depicting site III, from: Album P75, Gretna II, 1916

Figure 5.11 (detail from figure 5.10): Unknown author “Site III Looking N at building 6A 30.01.16” 1916

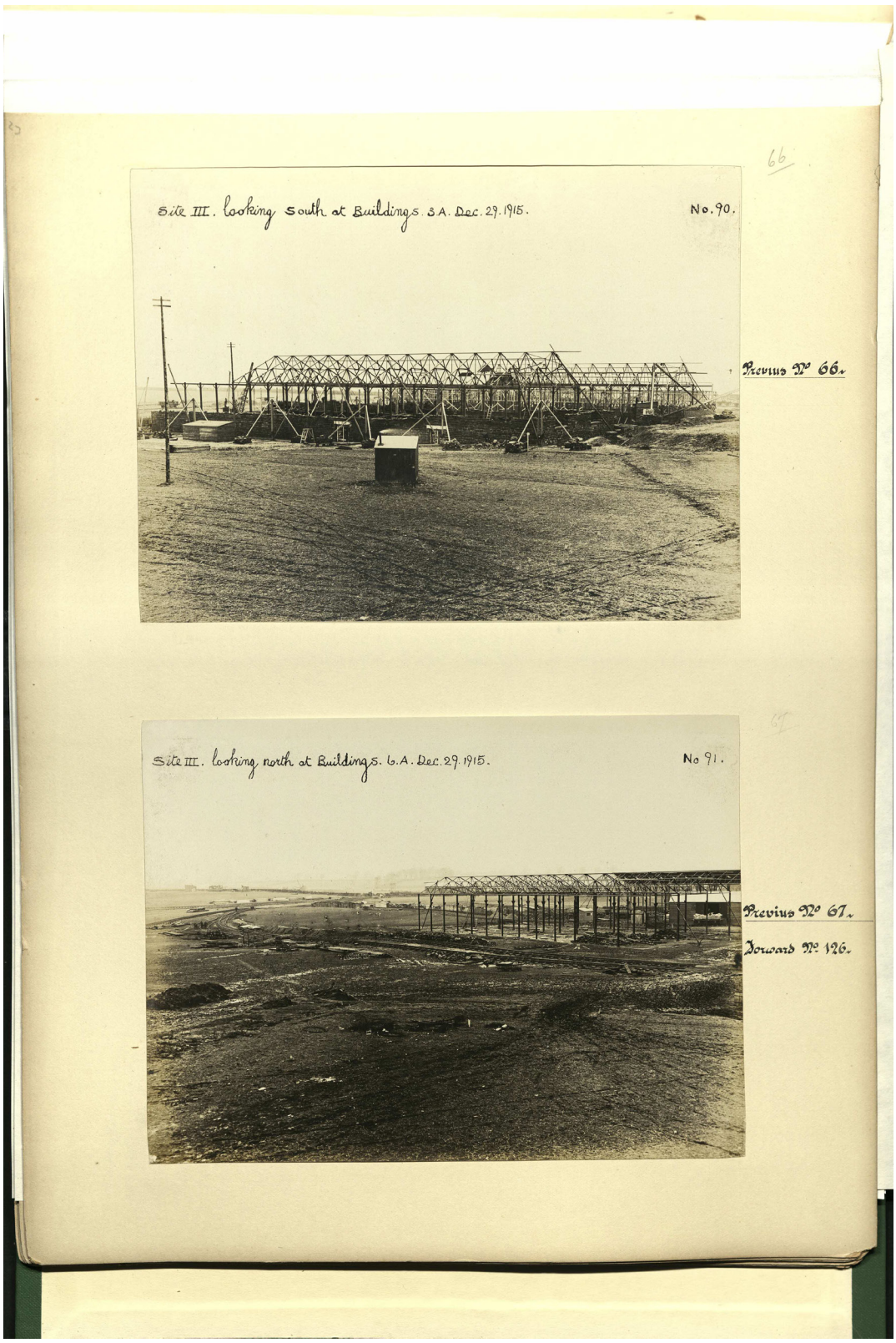


Figure 5.12: Unknown author, two photographs depicting site III, from: Album P74, Gretna I, 1915-1916

Figure 5.13 (detail from figure 5.12): Unknown Photographer “Site III Looking N at building 6A Dec 29” 1915

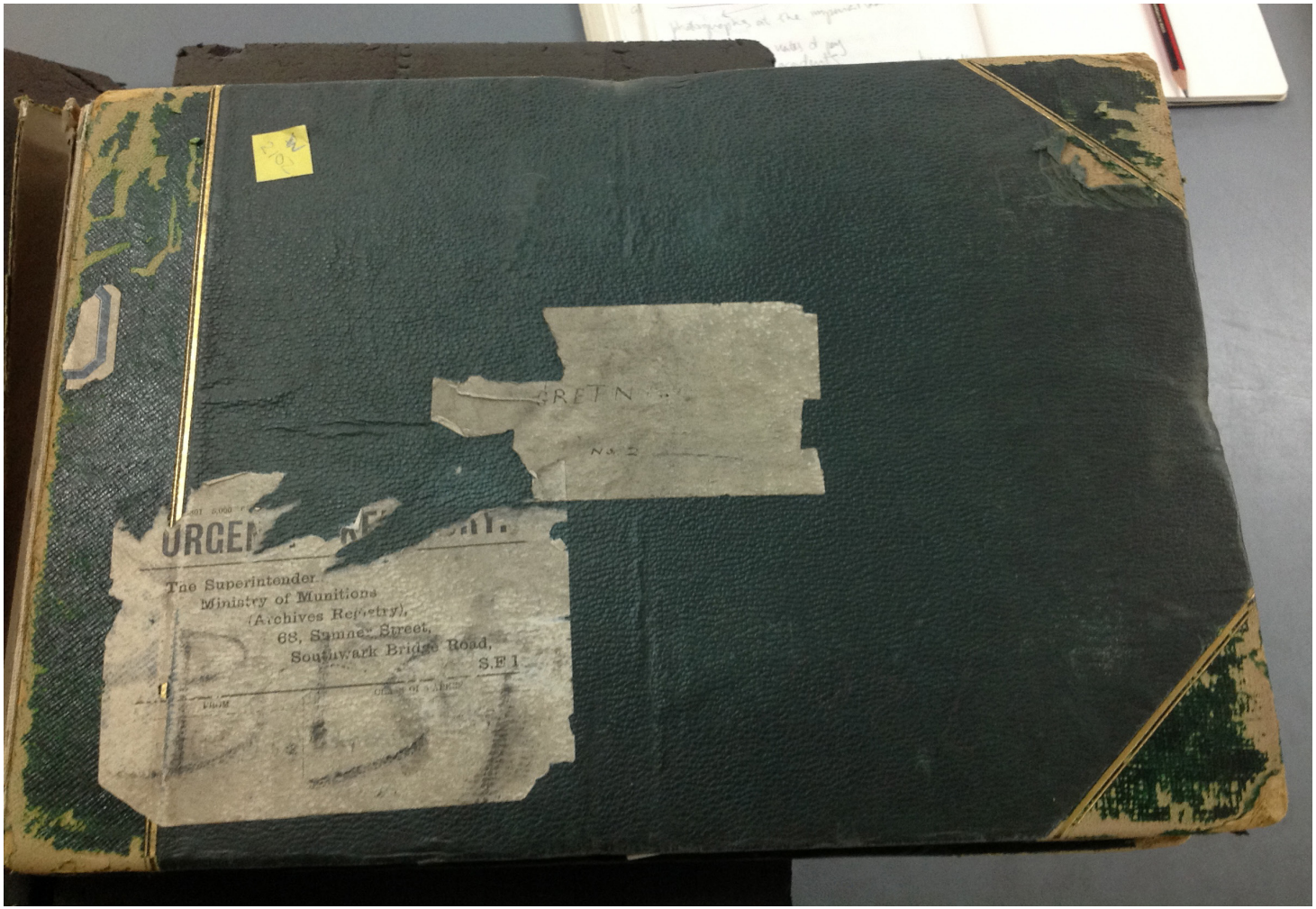


Figure 5.14: Author's image, "Photographs of HM Explosives Factory, Gretna, Dumfries" part 1, 2014

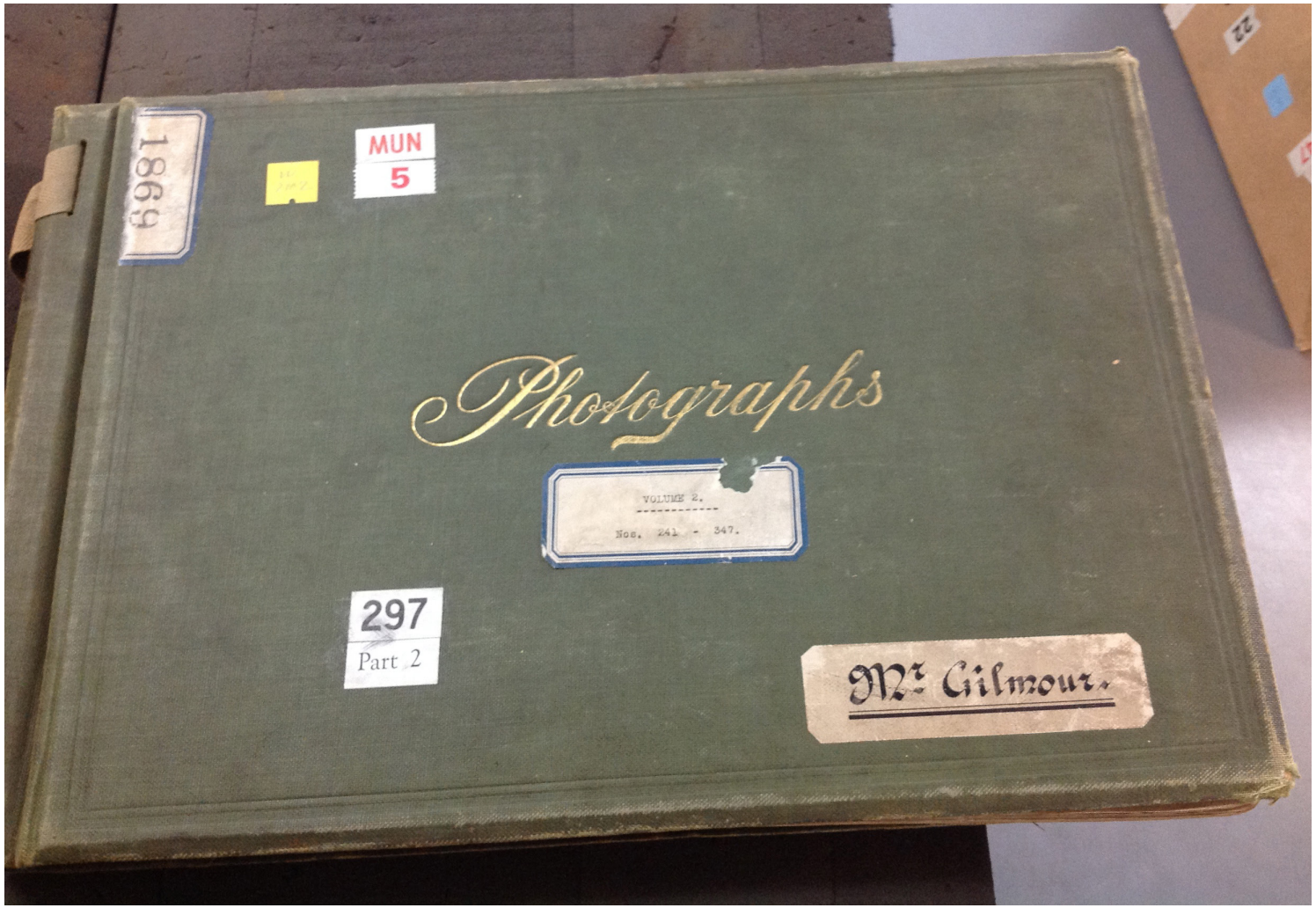


Figure 5.15: Author's image, "Photographs of HM Explosives Factory, Gretna, Dumfries" part 2, 2014

Figure 5.16: Unknown author, “Gretna Township” in: Album P79, Gretna VI, 1918

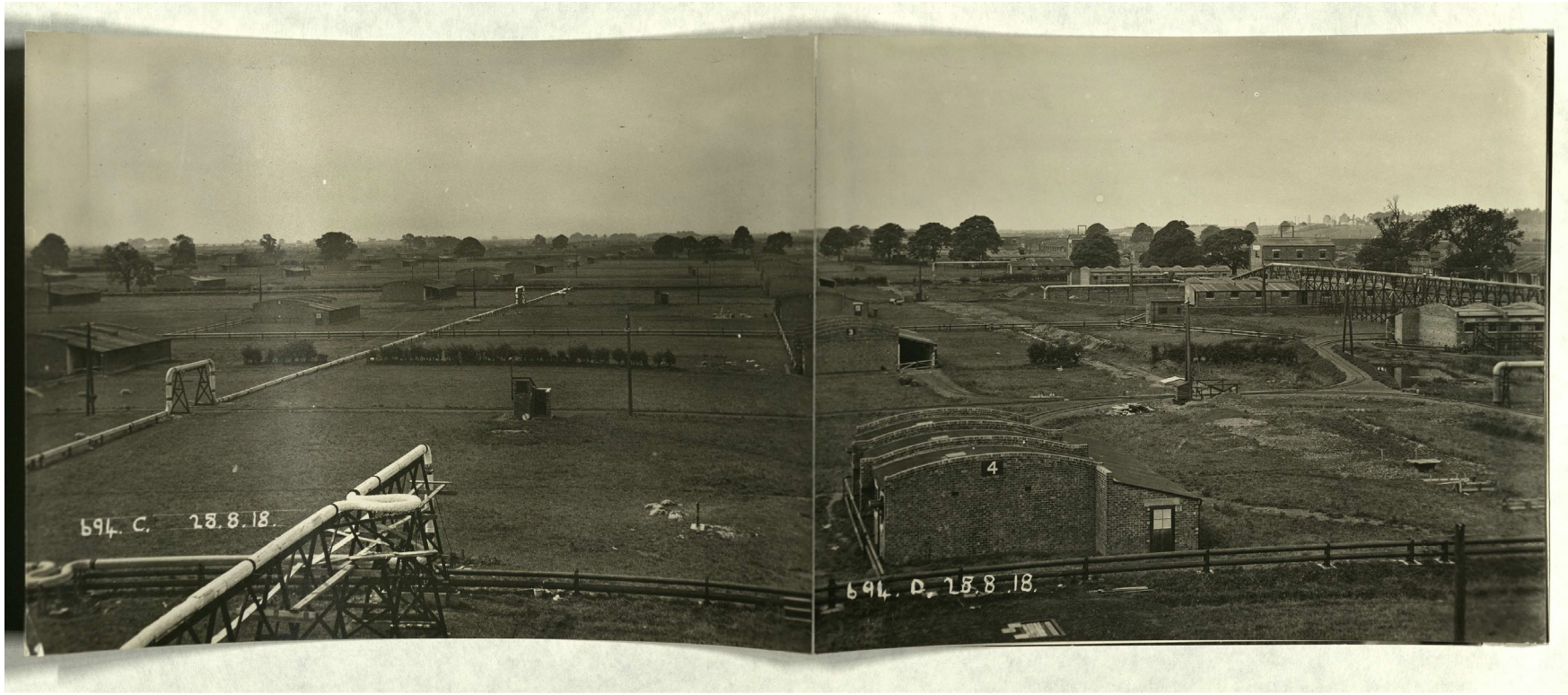


Figure 5.17: Unknown author, detail of panorama P79/12, photographs C and D, in Album P79, Gretna VI, 1918

Figure 5.18: Unknown author, two photographs depicting female workers at the Mossband site, from: Album P79, Gretna VI, 1918

Figure 5.19: Unknown author, two photographs depicting female workers at the Mossband site and the interior of the nitrating house, from: Album P79, Gretna VI, 1918

Figure 6.1: Unknown author, “Office of Messrs. S. Pearson & Son, Limited, London”

Figure 6.2: Unknown author, “the Right Hon. LORD COWDRAY, president of Messrs S. Pearson & Son Ltd”

Figure 6.3: Unknown author, “Ivybridge Viaduct” 1892

Figure 6.4: Unknown author, “Great Western railway works, South Devon-Ivybridge Viaduct” 1892

Figure 6.5: Richard Ellis, “General view of harbour, showing the completed breakwaters” 1909

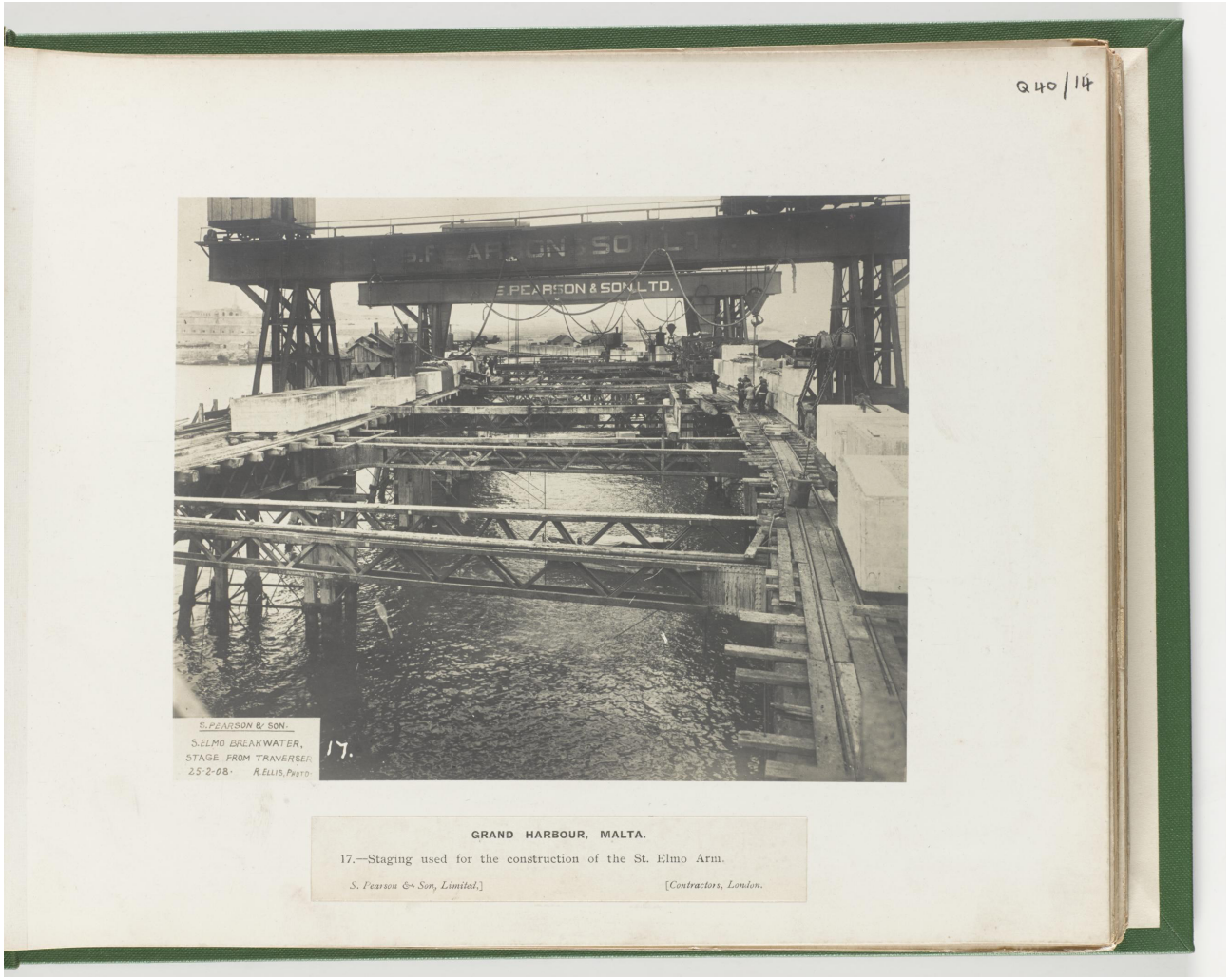


Figure 6.6: Richard Ellis, “Staging used for the construction of the St Elmo Arm” 1908

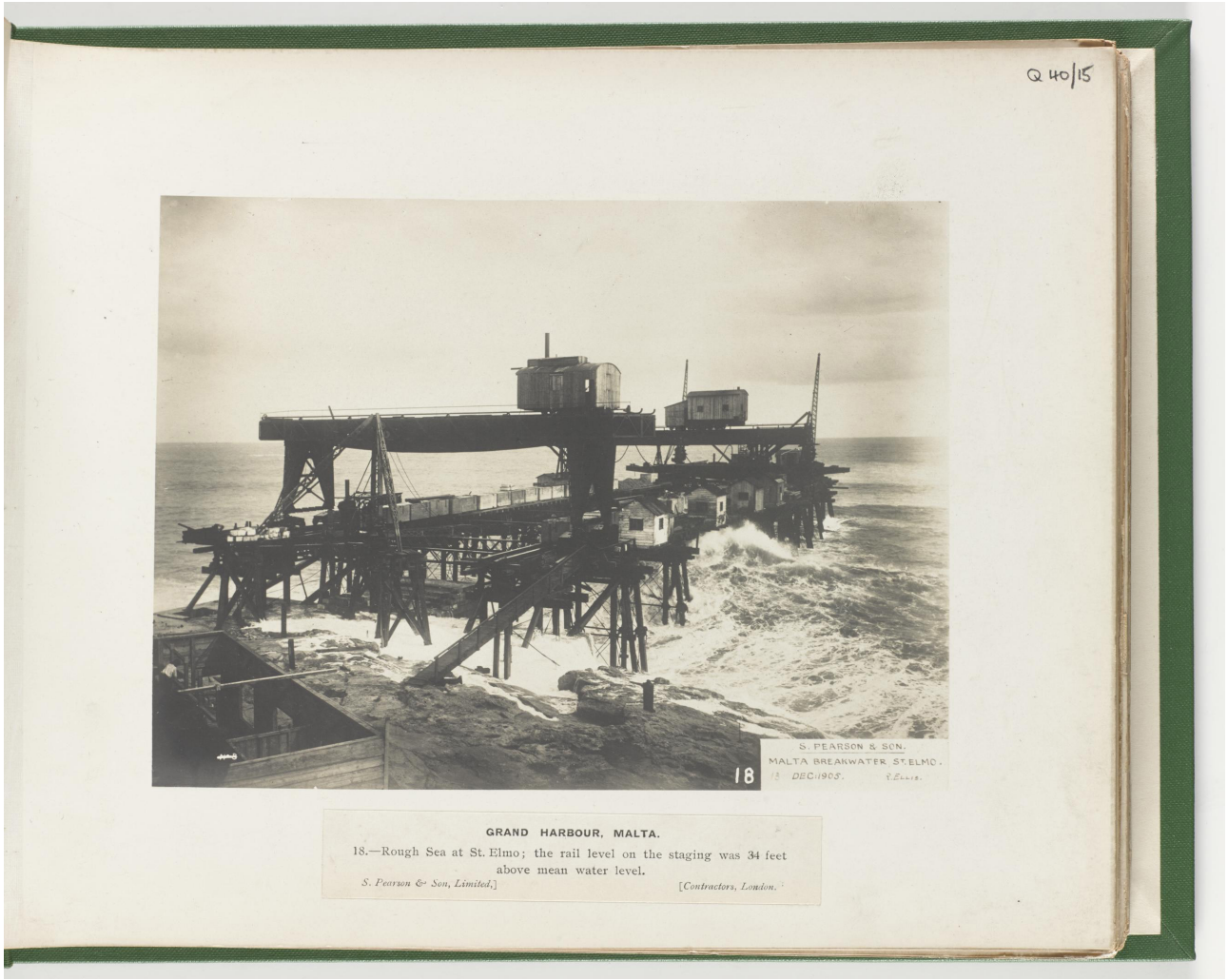


Figure 6.7: Richard Ellis, "Rough sea at St. Elmo; the rail level on the staging was 34 feet above mean level water" 1905

Figure 6.8: Richard Ellis, “Ricasoli arm, St. Elmo staging in distance” 1905

Figure 6.9: Untitled author, album cover, “Sennar dam and Gezira irrigation works” 1923-1925

Figure 6.10: F.B, “Sennar Dam. Excavation in deep channel looking west” 1924

Figure 6.11: F.B, “Sennar Dam. General view downstream, looking east” 1924

Figure 6.12: F. B, “Sennar Dam. General view downstream, looking east” 1924

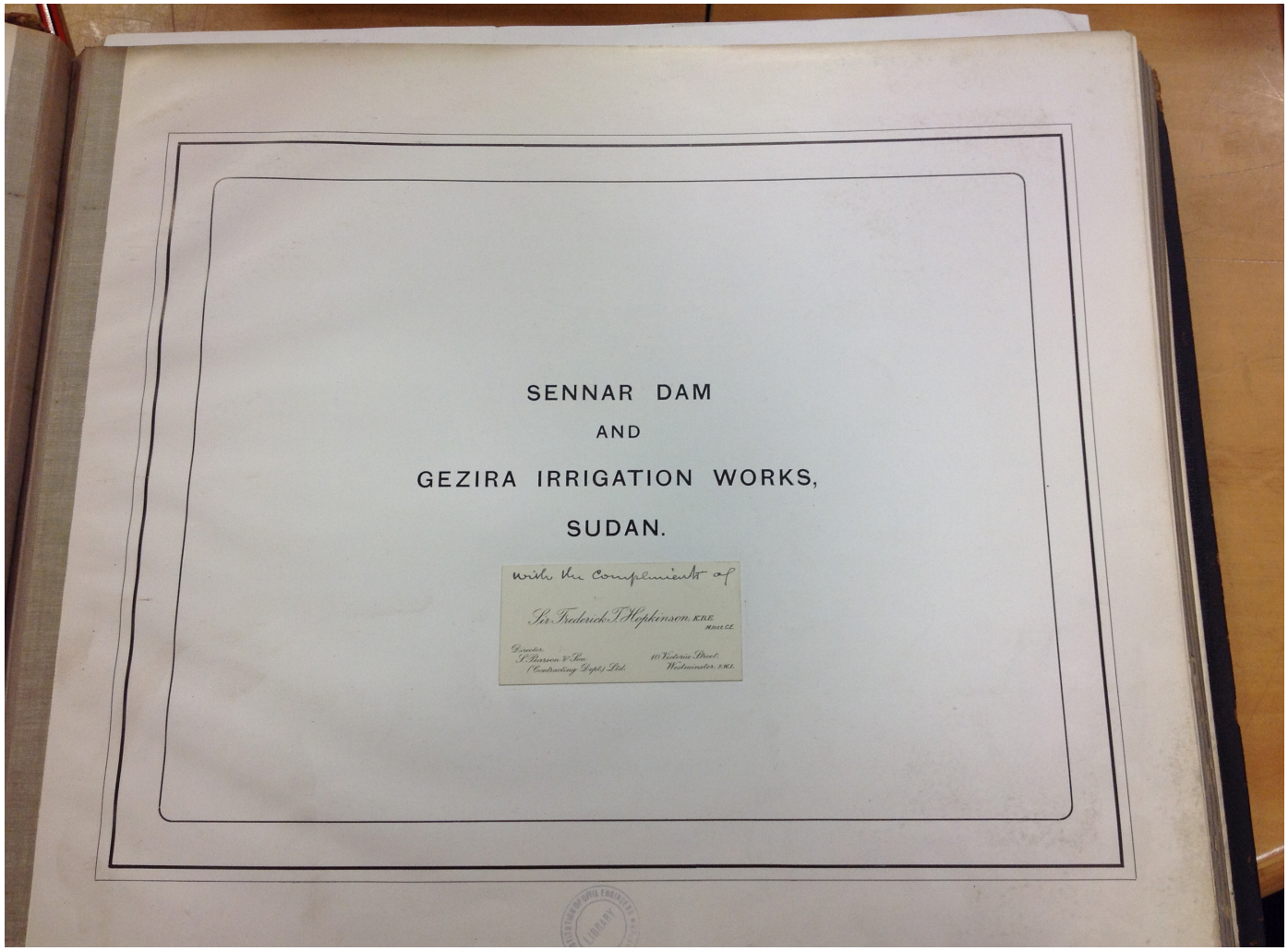
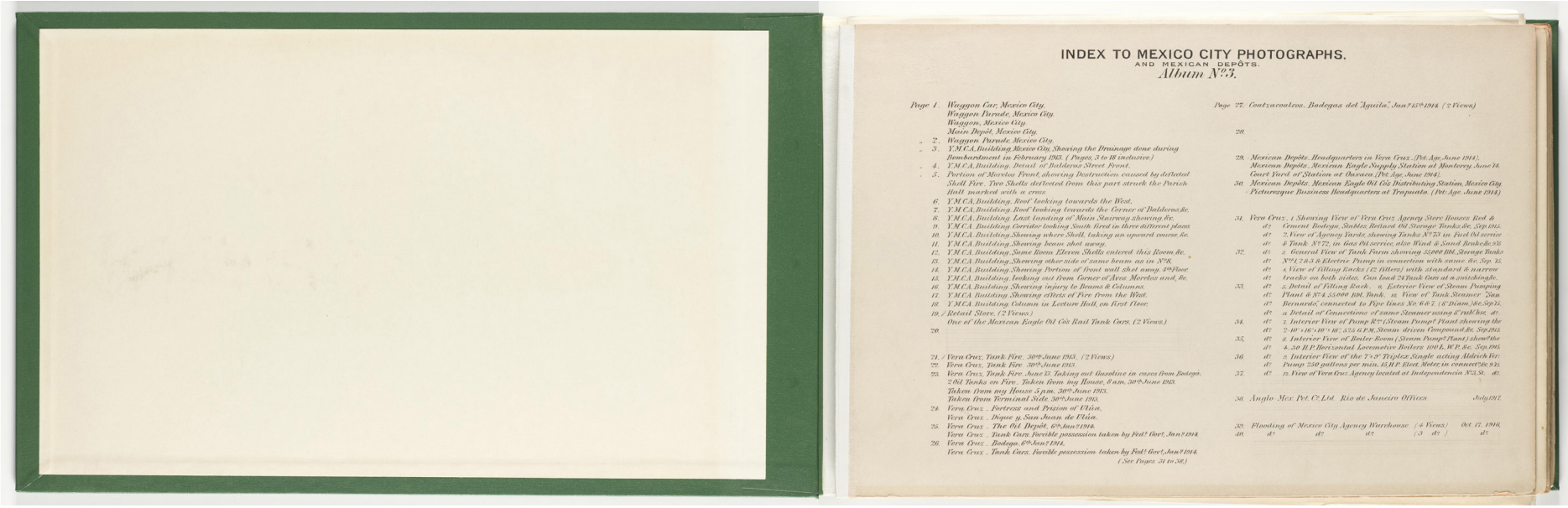


Figure 6.13: Author's image, first page of the "Sennar dam and Gezira Irrigation works, Sudan" album in the Institution of Civil Engineers Archives and Library, 2014

Appendix B: Sample of a Progress album

PEA P3, “Mexico City and Mexican Depots” 1913-1917

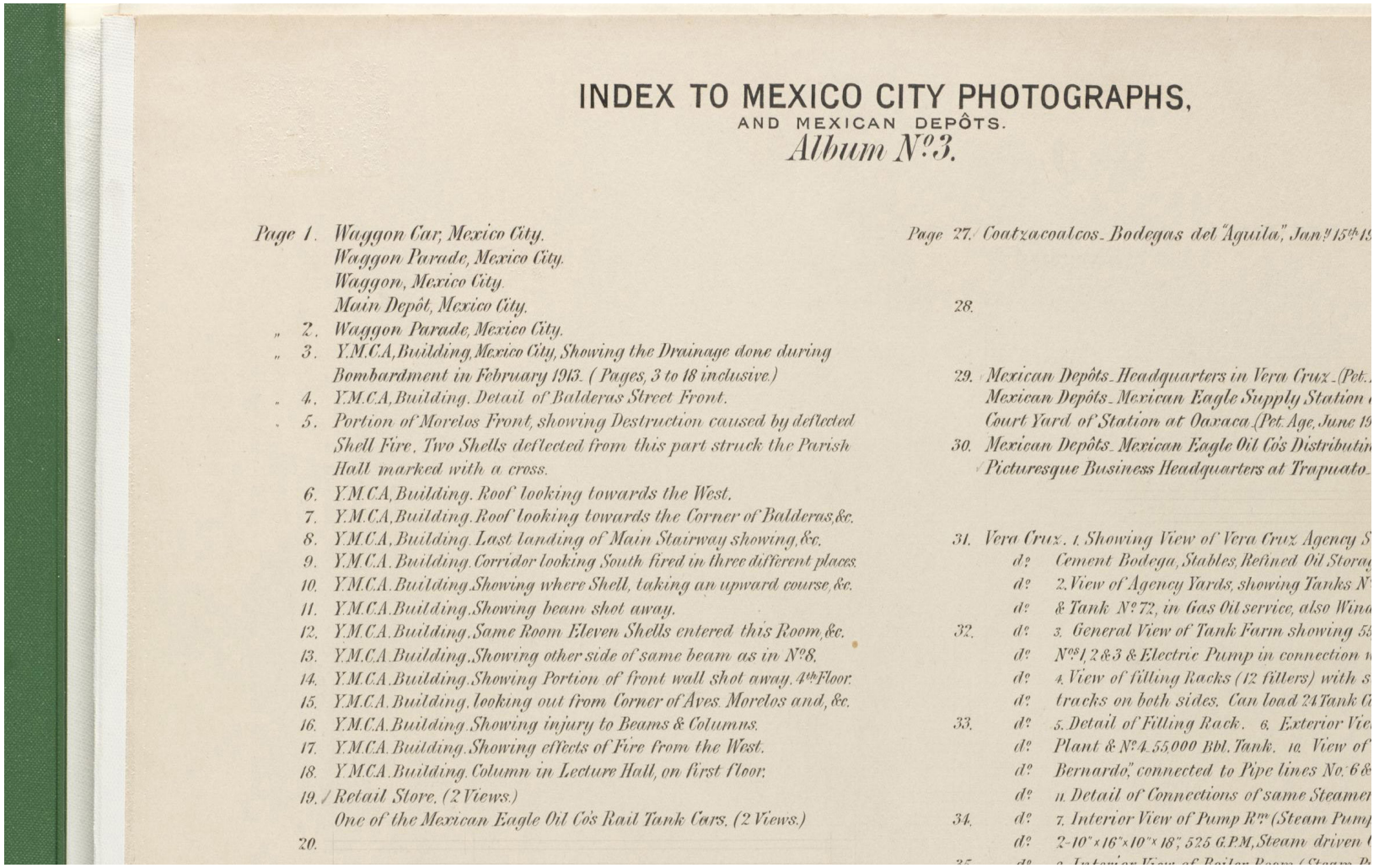


INDEX TO MEXICO CITY PHOTOGRAPHS.
AND MEXICAN DEPÔTS.
Album N°3.

Page 1. Waggon Car, Mexico City.
Waggon Parade, Mexico City.
Waggon, Mexico City.
Main Depôt, Mexico City.
" 2. Waggon Parade Mexico City.
" 3. Y.M.C.A. Building Mexico City, Showing the Drainage done during Bombardment in February 1913. (Pages, 3 to 6 inclusive.)
" 4. Y.M.C.A. Building. Detail of Balderas Street Front.
" 5. Portion of Morelos Front, showing Destruction caused by deflected Shell Fire. Two Shells deflected from this part struck the Parish Hall marked with a cross.
6. Y.M.C.A. Building. Roof looking towards the West.
7. Y.M.C.A. Building. Roof looking towards the Corner of Balderas &c.
8. Y.M.C.A. Building. Last landing of Main Stairway showing &c.
9. Y.M.C.A. Building Corridor looking South. fired in three different places.
10. Y.M.C.A. Building Showing where Shell, taking an upward course &c.
11. Y.M.C.A. Building Showing beam shot away.
12. Y.M.C.A. Building. Same Room. Eleven Shells entered this Room &c.
13. Y.M.C.A. Building. Showing other side of same beam as in N°8.
14. Y.M.C.A. Building Showing Portion of front wall shot away. 4th Floor.
15. Y.M.C.A. Building. looking out from Corner of Aves. Morelos and, &c.
16. Y.M.C.A. Building. Showing injury to Beams & Columns.
17. Y.M.C.A. Building. Showing effects of Fire from the West.
18. Y.M.C.A. Building. Column in Lecture Hall, on First Floor.
19. (Retail Store. (2 Views.)
One of the Mexican Eagle Oil Co's Rail Tank Cars. (2 Views.)
20.
21. (Vera Cruz. Tank Fire. 30th June 1913. (2 Views.)
22. Vera Cruz. Tank Fire. 30th June 1913.
23. Vera Cruz. Tank Fire. June 13. Taking out Gasoline in cases from Bodega. 2 Oil Tanks on Fire. Taken from my House, 8 am, 30th June 1913.
Taken from my House 3 pm. 30th June 1913.
Taken from Terminal Side 30th June 1913.
24. Vera Cruz. Fortress and Prision of Ulúa.
Vera Cruz. Peque ño San Juan de Ulúa.
25. Vera Cruz. The Old Depôt. 6th Jan° 1914.
Vera Cruz. Tank Cars. Forcible possession taken by Fed¹ Govt, Jan° 1914.
26. Vera Cruz. Bodega. 6th Jan° 1914.
Vera Cruz. Tank Cars. Forcible possession taken by Fed¹ Govt, Jan° 1914.
(See Pages 31 to 36.)

Page 27. Coatzacoalcos. Bodegas del "Aguila", Jan° 15th 1914. (2 Views.)
28.
29. Mexican Depôts. Headquarters in Vera Cruz. (Pet. Age. June 1914).
Mexican Depôts. Mexican Eagle Supply Station at Monterey, June 14.
Court Yard of Station at Oaxaca (Pet. Age. June 1914).
30. Mexican Depôts. Mexican Eagle Oil Co's Distributing Station, Mexico City
Picturesque Business Headquarters at Tropuata. (Pet. Age. June 1914)
31. Vera Cruz. 1. Showing View of Vera Cruz Agency Store Houses Red &
" " General Bodega, Rubber Belt and Oil Storage Tanks &c. Sep 1913.
" " 2. View of Agency Yards showing Tanks N°s 73 in Fuel Oil service
" " & Tank N°72, in Gas Oil service, also Wind & Sand Brake &c 935
32. " " 3. General View of Tank Farm showing 55000 Bbl. Storage Tanks
" " N°s 1 2 & 3 & Electric Pump in connection with same. &c. Sep 13.
" " 4. View of Filling Racks (12 Pillars) with standard & narrow
" " tracks on both sides. Can load 24 Tank Cars at a switchings.
33. " " 5. Detail of Filling Rack. a. Exterior View of Steam Pumping
" " Plant & N°4 55000 Bbl. Tank. b. View of Tank Steamer "San
" " Bernardo" connected to Pipe Lines N°s 6 & 7. (8" Diam.) &c. Sep 13.
" " a. Detail of Connections of same Steamer using 8" rubber &c.
34. " " 7. Interior View of Pump N°7 (Steam Pump¹ Plant showing the
" " 2-10" × 16"× 10" × 16". 375 G.P.M. Steam driven Compound &c. Sep 1913.
35. " " 8. Interior View of Boiler Room (Steam Pump¹ Plant) show¹ the
" " 4. 50 H.P. Horizontal Locomotive Boilers 100 L. W.P. &c. Sep 1913.
36. " " 9. Interior View of the 75 x 9" Triplex Single acting Aldrich Ver.
" " Pump 750 gallons per min. 65 H.P. Elect. Motor in connect¹ &c. 913.
37. " " 10. View of Vera Cruz Agency located at Independencia N°52. St. &c.
38. Anglo Mex. Pet. Co. Ltd. Rio de Janeiro Offices. July 1917.
39. Flooding of Mexico City Agency Warehouse. (4 Views.) Oct. 17. 1916.
40. " " " " (3 ") "

Figure 4.1: Author unknown, album cover and "Index to Mexico City Photographs", 1913-1917



INDEX TO MEXICO CITY PHOTOGRAPHS,
AND MEXICAN DEPÔTS.
Album N°3.

Page 1. Waggon Car, Mexico City.
Waggon Parade, Mexico City.
Waggon, Mexico City.
Main Depôt, Mexico City.
" 2. Waggon Parade, Mexico City.
" 3. Y.M.C.A, Building, Mexico City, Showing the Drainage done during Bombardment in February 1913. (Pages, 3 to 18 inclusive.)
" 4. Y.M.C.A, Building. Detail of Balderas Street Front.
" 5. Portion of Morelos Front, showing Destruction caused by deflected Shell Fire. Two Shells deflected from this part struck the Parish Hall marked with a cross.
6. Y.M.C.A, Building. Roof looking towards the West.
7. Y.M.C.A, Building. Roof looking towards the Corner of Balderas, &c.
8. Y.M.C.A, Building. Last landing of Main Stairway showing, &c.
9. Y.M.C.A. Building. Corridor looking South fired in three different places.
10. Y.M.C.A. Building. Showing where Shell, taking an upward course, &c.
11. Y.M.C.A. Building. Showing beam shot away.
12. Y.M.C.A. Building. Same Room Eleven Shells entered this Room, &c.
13. Y.M.C.A. Building. Showing other side of same beam as in N°8.
14. Y.M.C.A. Building. Showing Portion of front wall shot away. 4th Floor.
15. Y.M.C.A. Building. looking out from Corner of Aves. Morelos and, &c.
16. Y.M.C.A. Building. Showing injury to Beams & Columns.
17. Y.M.C.A. Building. Showing effects of Fire from the West.
18. Y.M.C.A. Building. Column in Lecture Hall, on first floor.
19. Retail Store. (2 Views.)
One of the Mexican Eagle Oil Co's Rail Tank Cars. (2 Views.)
20.

Page 27. Coatzacoalcos. Bodegas del "Aguila", Jan.y 15th 19
28.
29. Mexican Depôts. Headquarters in Vera Cruz. (Pet.
Mexican Depôts. Mexican Eagle Supply Station
Court Yard of Station at Oaxaca. (Pet. Age, June 19
30. Mexican Depôts. Mexican Eagle Oil Co's Distributin
Picturesque Business Headquarters at Trapuato.
31. Vera Cruz. 1. Showing View of Vera Cruz Agency S
d° Cement Bodega, Stables, Refined Oil Storag
d° 2. View of Agency Yards, showing Tanks N
d° & Tank N° 72, in Gas Oil service, also Wind
32. d° 3. General View of Tank Farm showing 55
d° N°s 1, 2 & 3 & Electric Pump in connection w
d° 4. View of filling Racks (12 fillers) with s
d° tracks on both sides. Can load 24 Tank C
33. d° 5. Detail of Filling Rack. 6. Exterior Vie
d° Plant & N°4. 55,000 Bbl. Tank. 10. View of
d° Bernardo," connected to Pipe lines No. 6 &
d° 11. Detail of Connections of same Steamer
34. d° 7. Interior View of Pump R.m (Steam Pump
d° 2-10" x 16" x 10" x 18", 525 G.P.M, Steam driven C
35. d° 9. Interior View of Boiler Room (Steam P

Figure 4.2 (detail from figure 4.1): "Index to Mexico City Photographs"

Figure 4.3: Unknown author, four photographs showing various scenes in Mexico City, 1913-1917

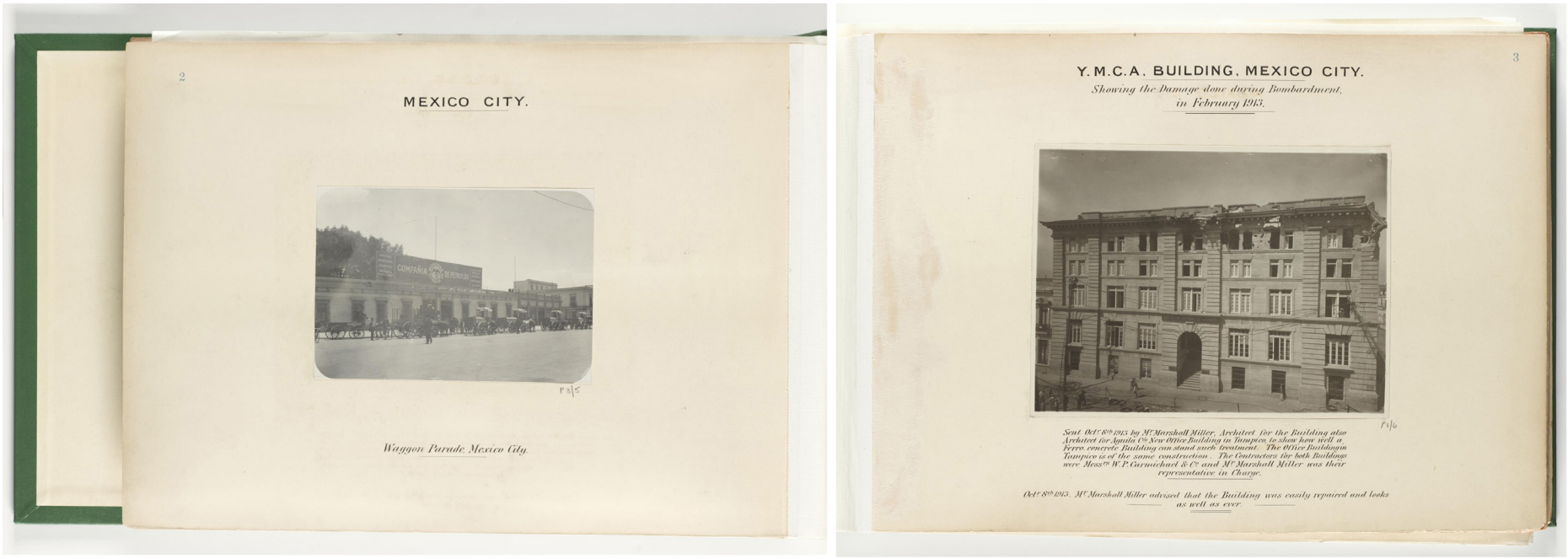


Figure 4.4: Unknown author, album pages depicting the company's office in Mexico City, including damage to the Y.M.C.A building, 1913

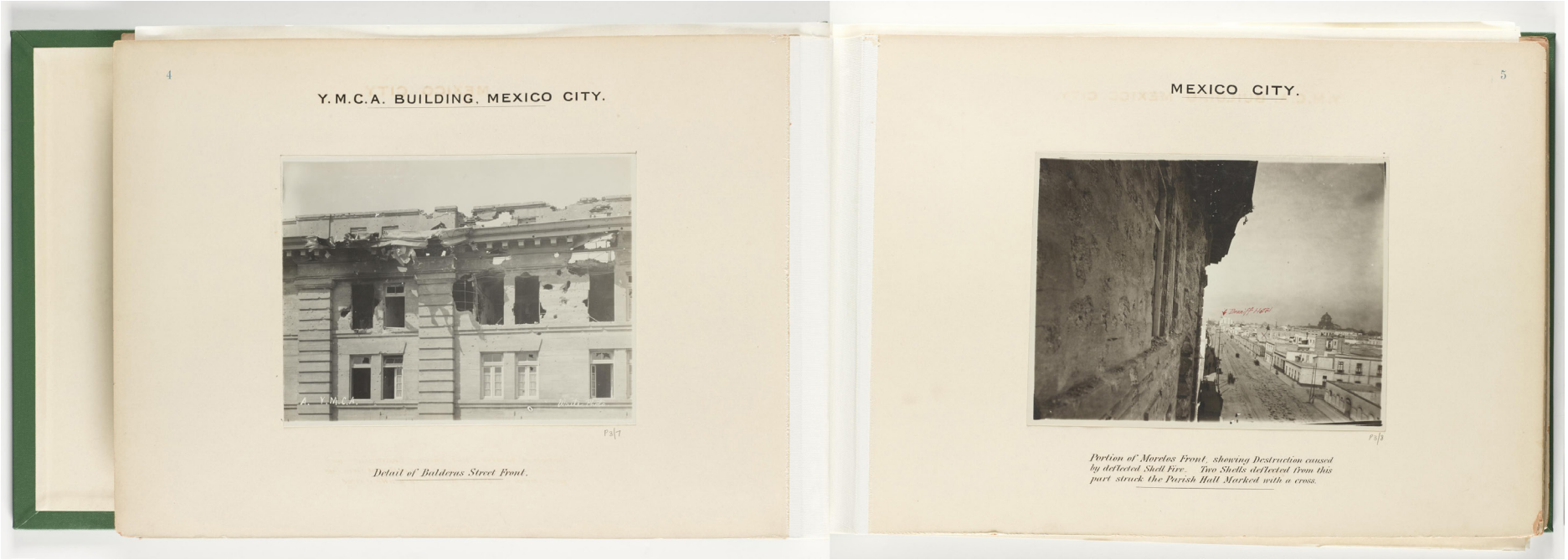


Figure 4.5: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

Figure 4.6: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

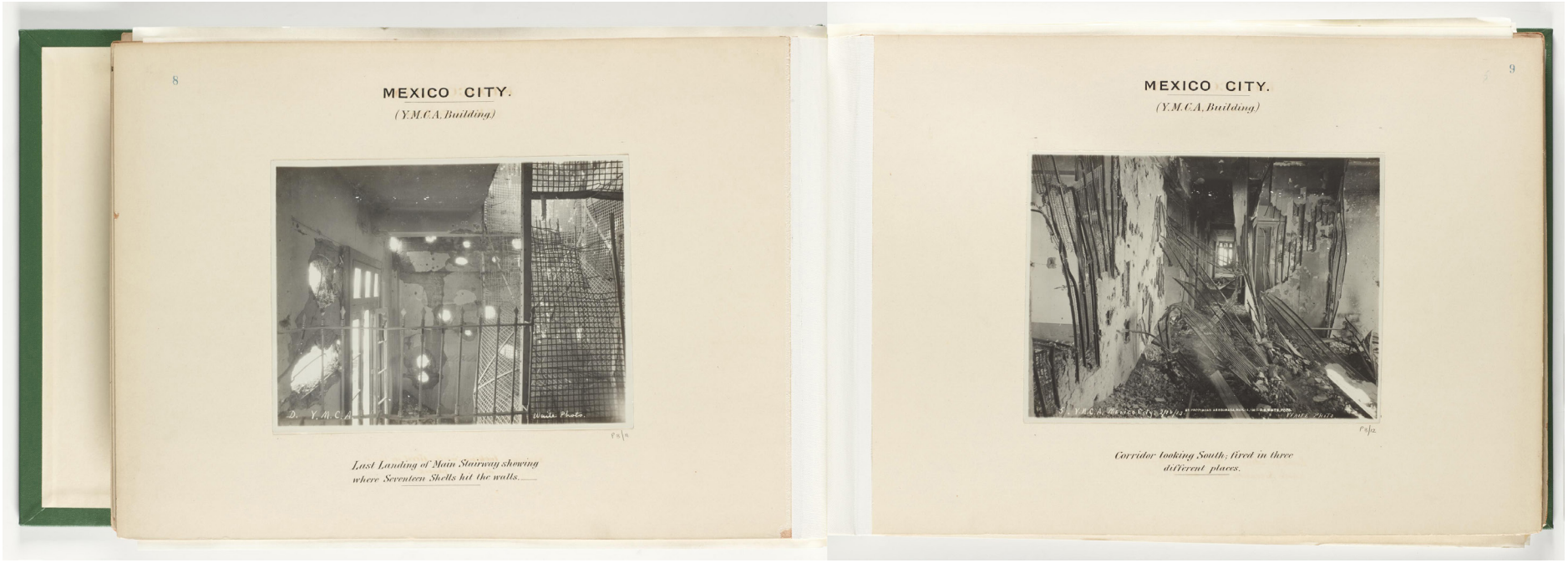


Figure 4.7: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

Figure 4.8: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

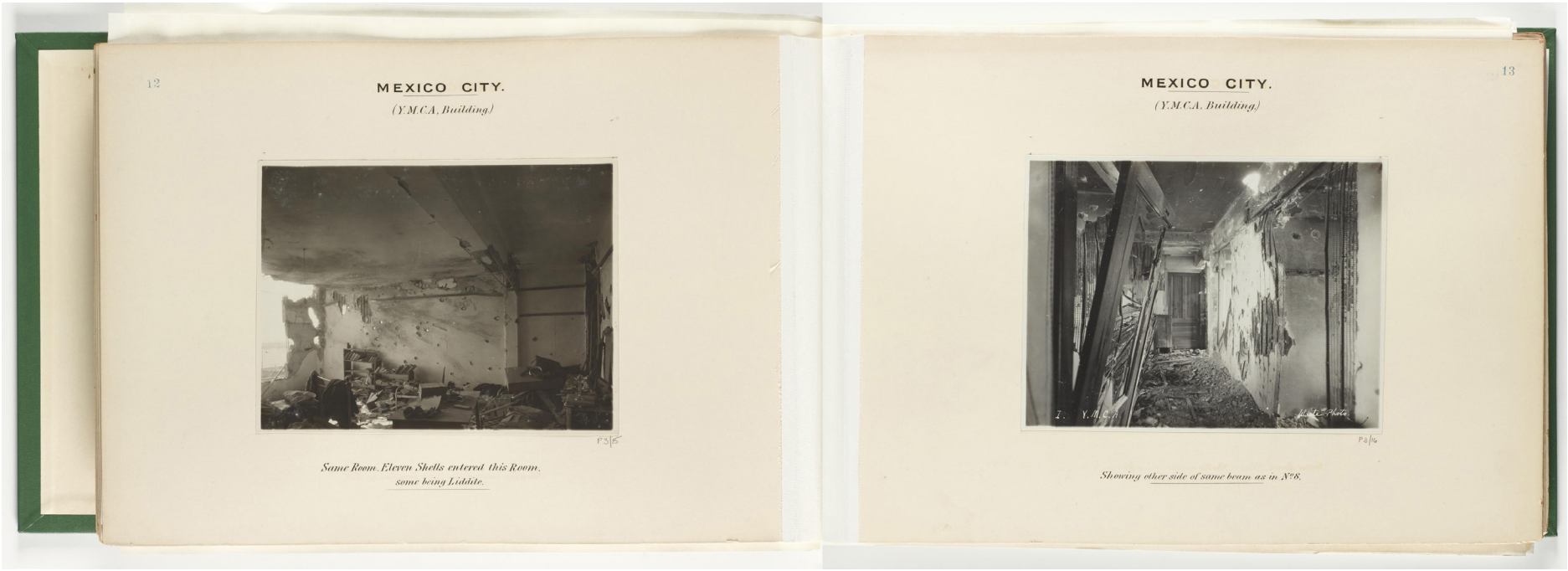


Figure 4.9: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

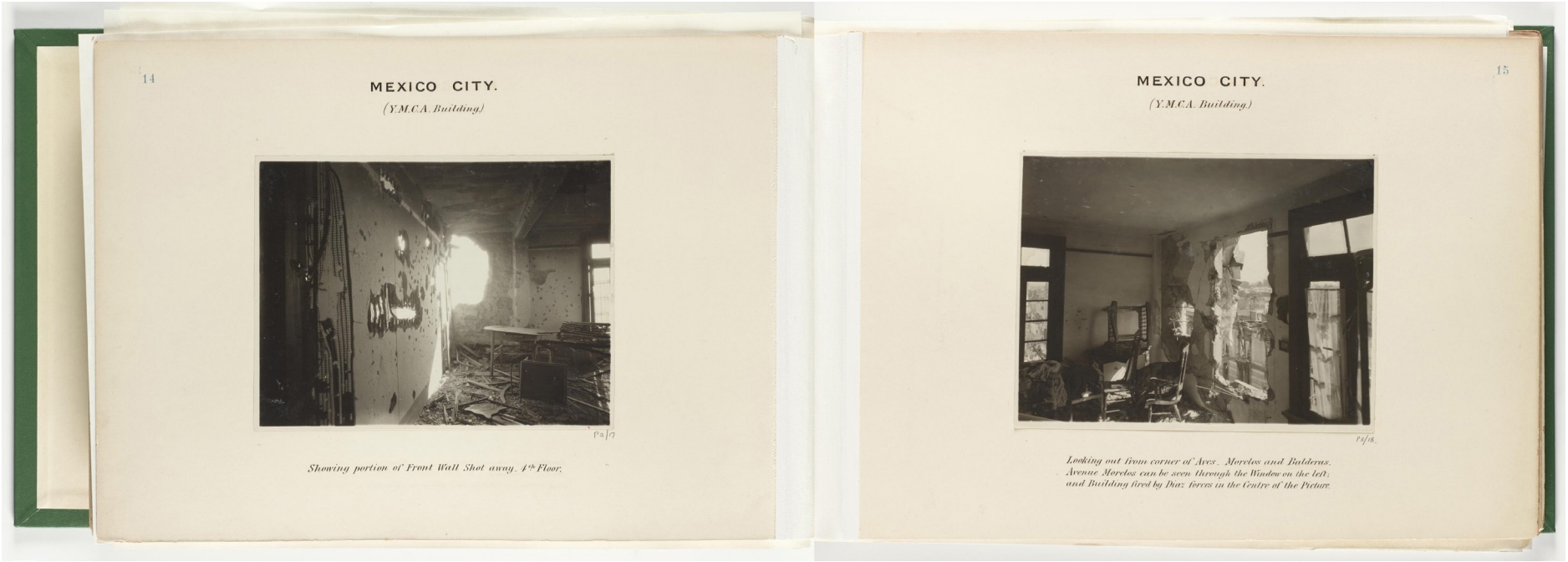


Figure 4.10: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

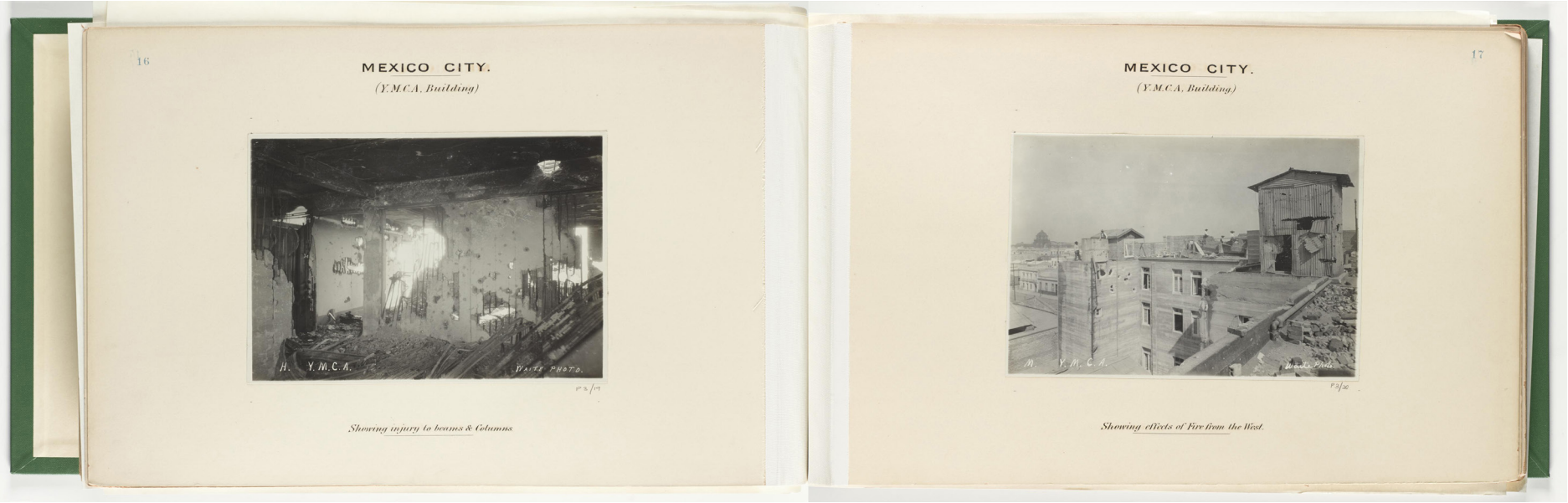


Figure 4.11: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, 1913

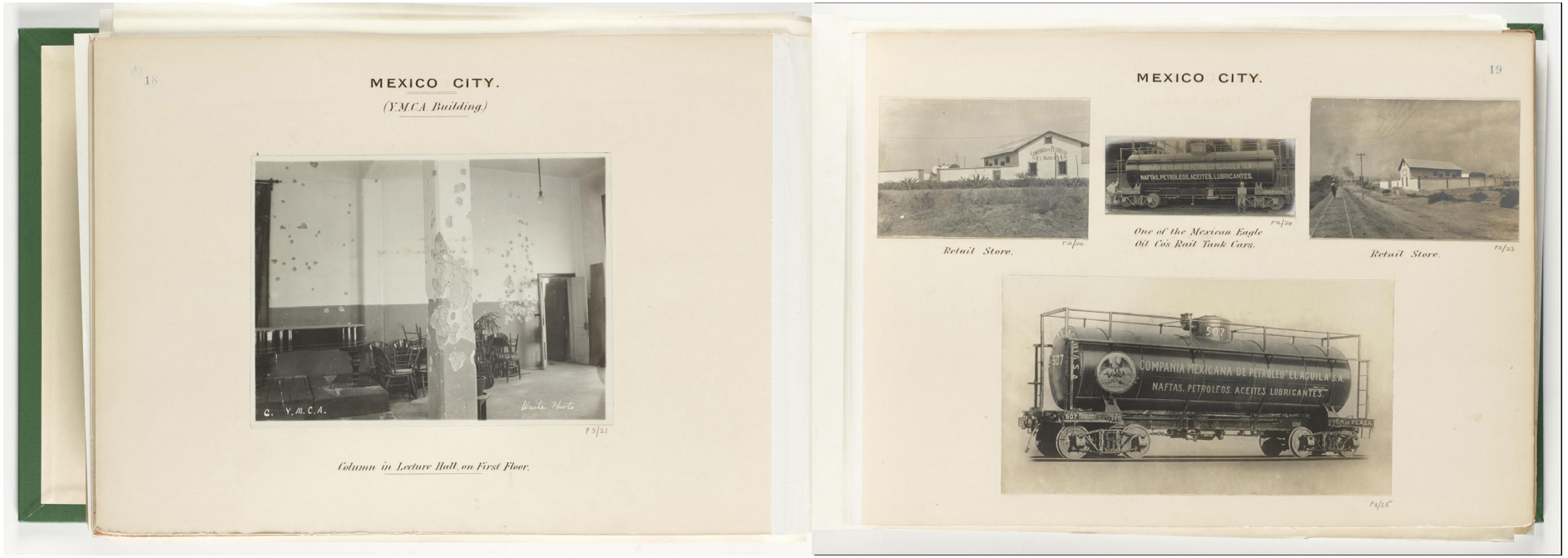


Figure 4.12: Unknown author, album pages depicting damage done to the Y.M.C.A building in Mexico City, and Mexican Eagle company holdings in Mexico City, 1913

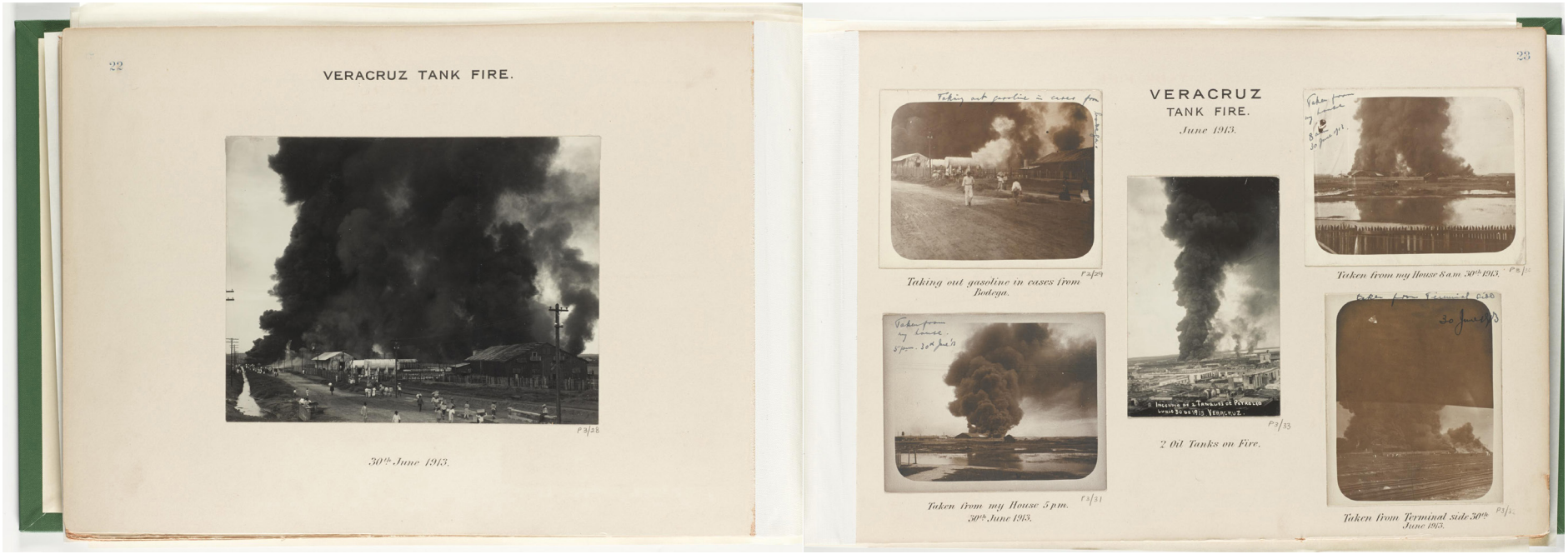
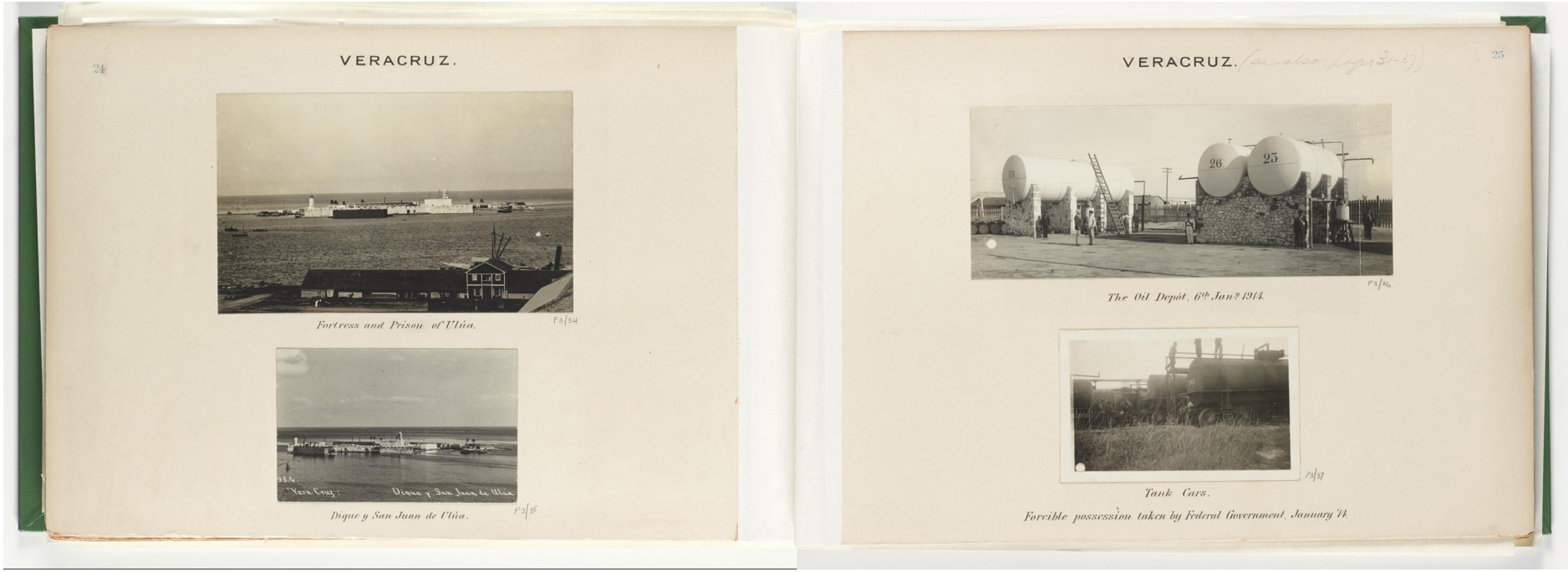
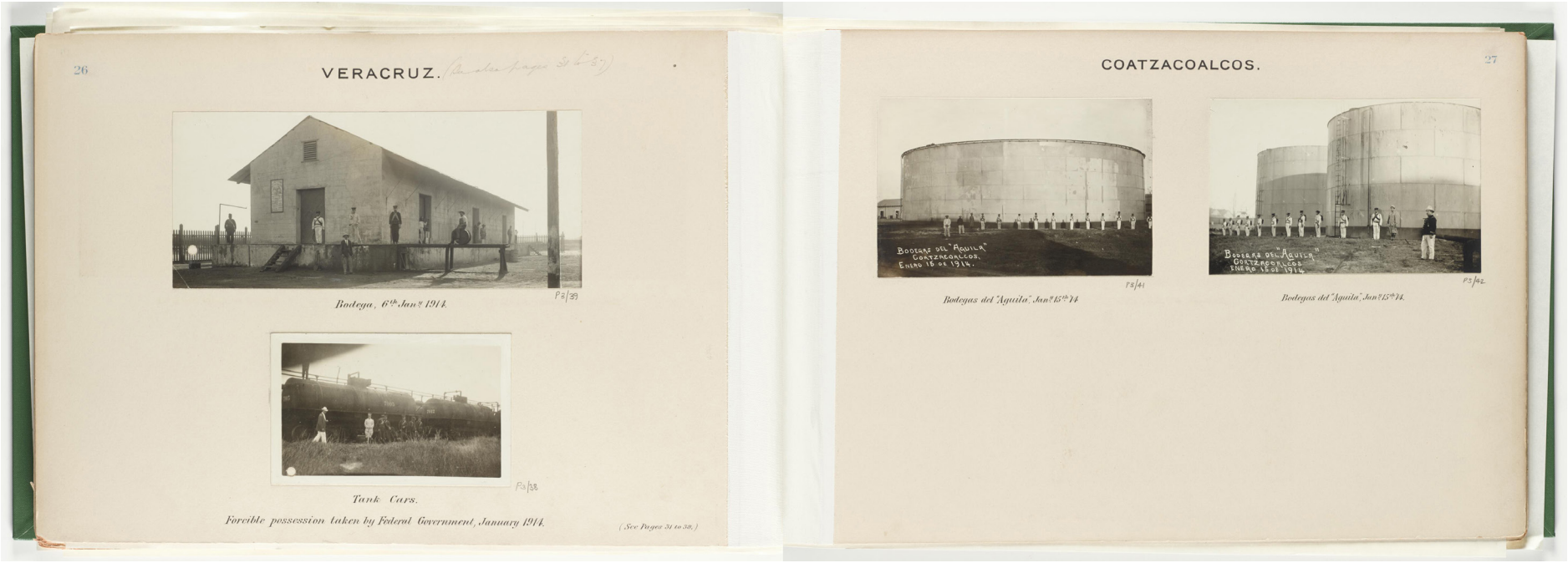


Figure 4.13: Unknown author, album pages depicting a fire in the company's oil tank in Vera Cruz, 1913



IFigure 4.14: Unknown author, album pages depicting the Ulua fortress and prison, and the company's oil depot, both in Veracruz, 1914



IFigure 4.15: Unknown author, album pages depicting the bodega in Veracruz, and the Coatzacoalcos bodegas, 1914

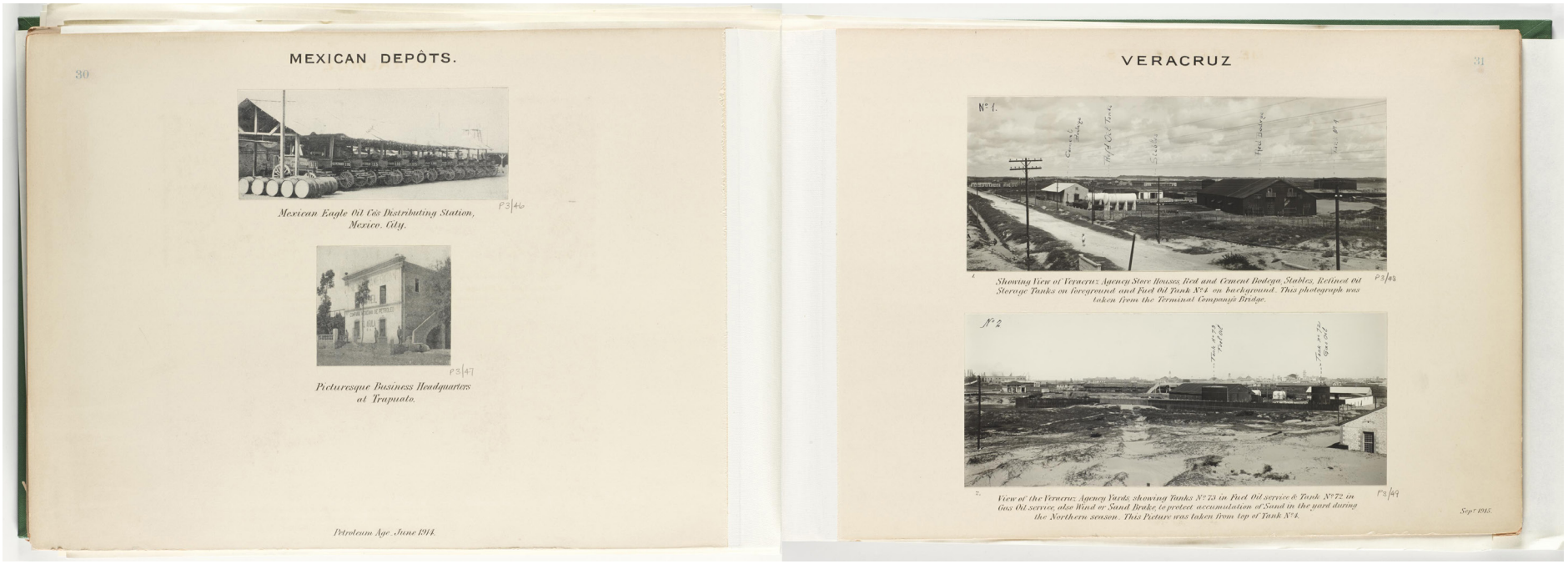


Figure 4.16: Unknown author, album pages depicting Mexican Eagle's distributing station in Mexico City, and the Veracruz store houses, 1914

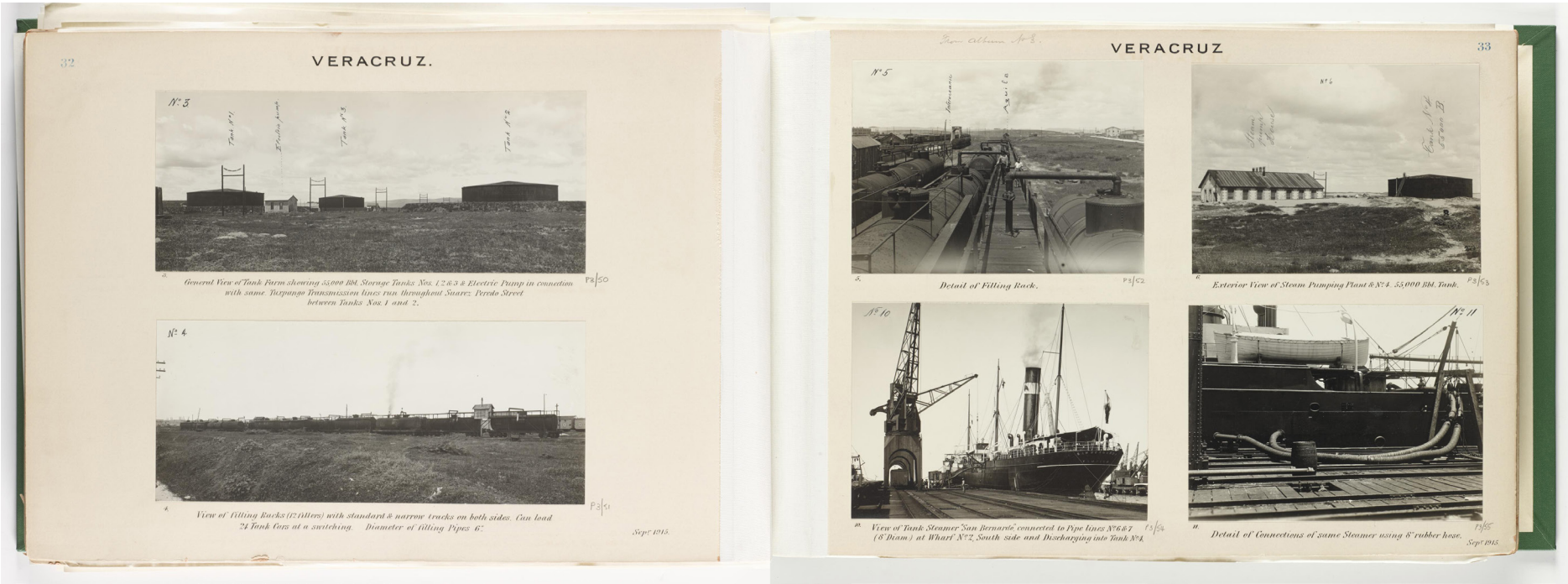


Figure 4.17: Unknown author, albums pages depicting general views of tanks in Veracruz, and tank steamers connected to pipe lines, 1915

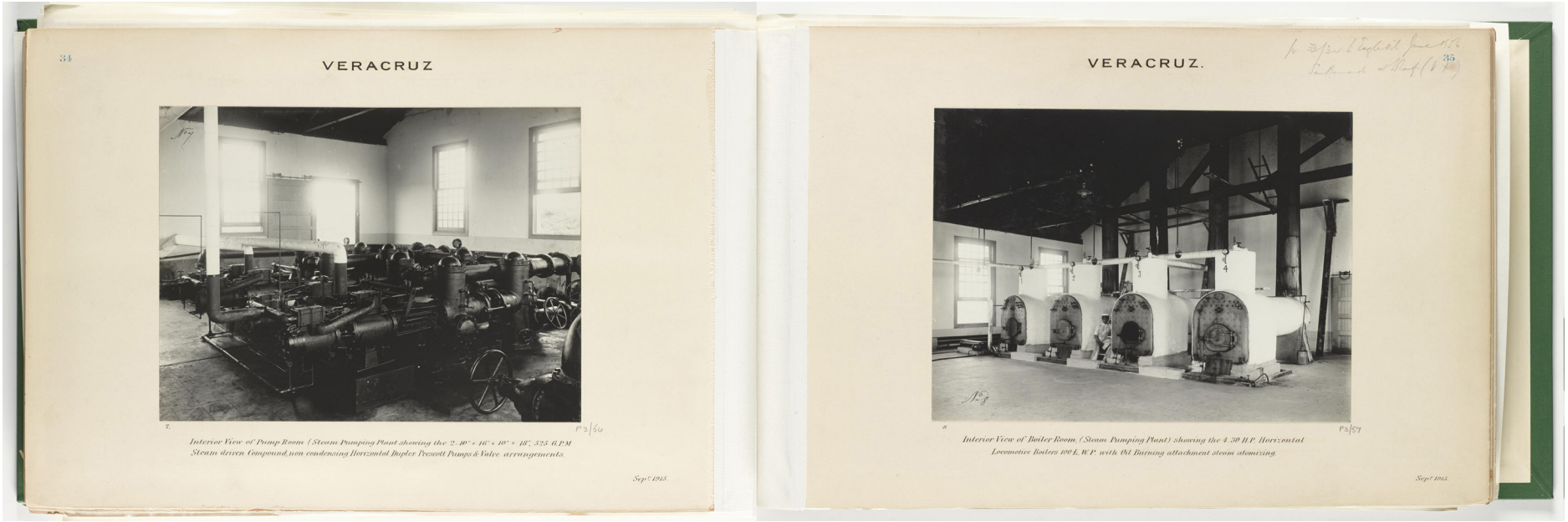


Figure 4.18: Unkown author, album pages depicting interior views of the pump room and boiler room in Vera Cruz, 1915

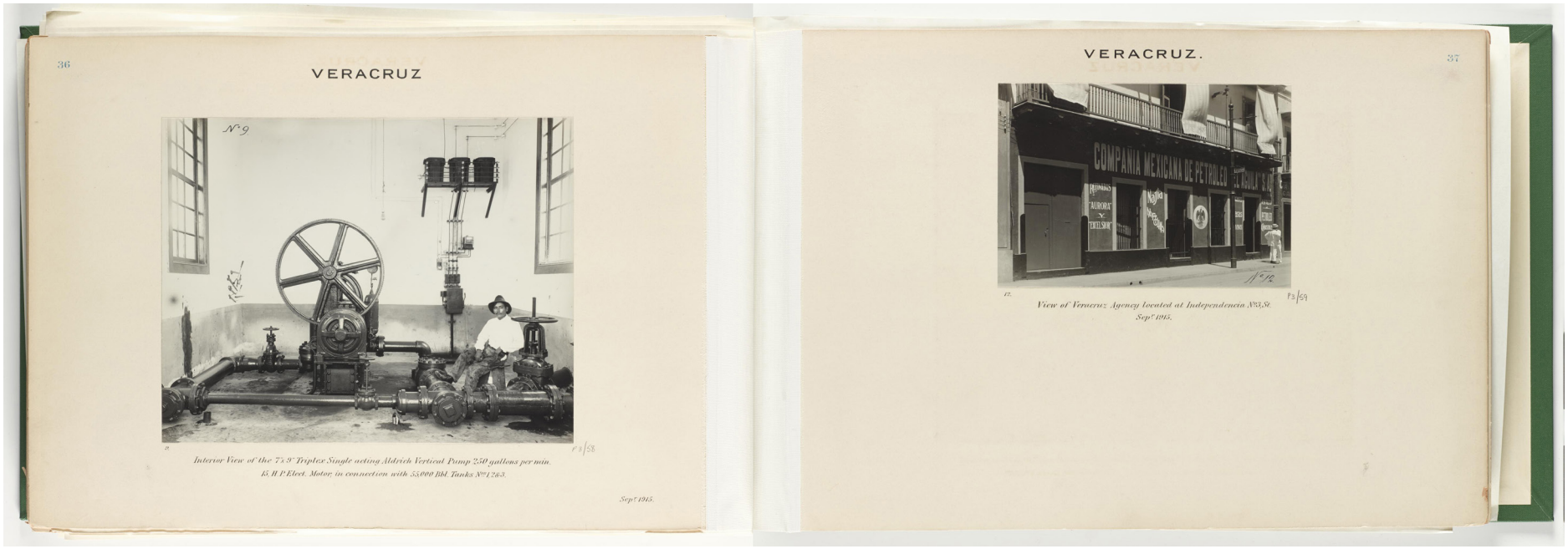


Figure 4.19: Unknown author, album pages depicting a vertical pump, and exterior view of the Mexican Eagle Vera Cruz agency, 1915

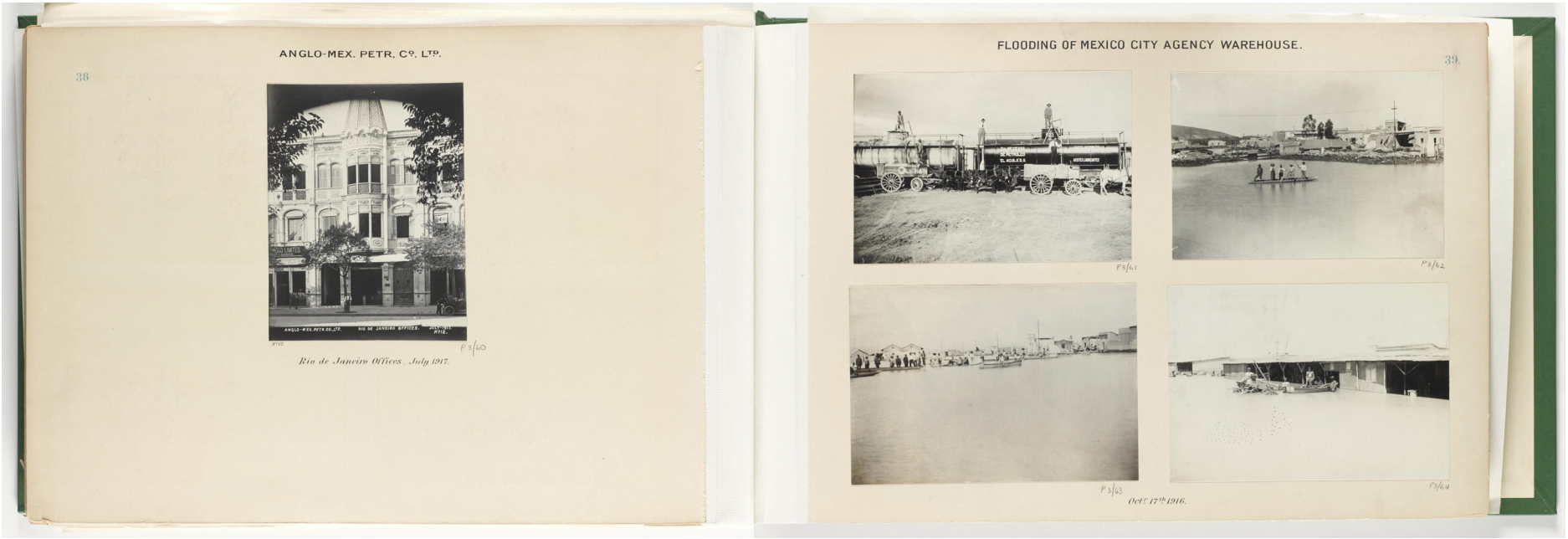


Figure 4.20: Author unknown, exterior view of the Anglo-Mexican Company office in Rio de Janeiro, and flooding of the Mexico City agencywarehouse, 1916-1917

Figure 4.21: Unknown authir, “Flooding of the Mexico City agency warehouse”, anvd album end cover, 1916

Appendix C: Sample of a Presentational album

PEA Q7, “Admiralty Harbour, Dover” 1902-1909

Figure 4.22: Album cover, “Admiralty Harbour, Dover”, 1902-1909

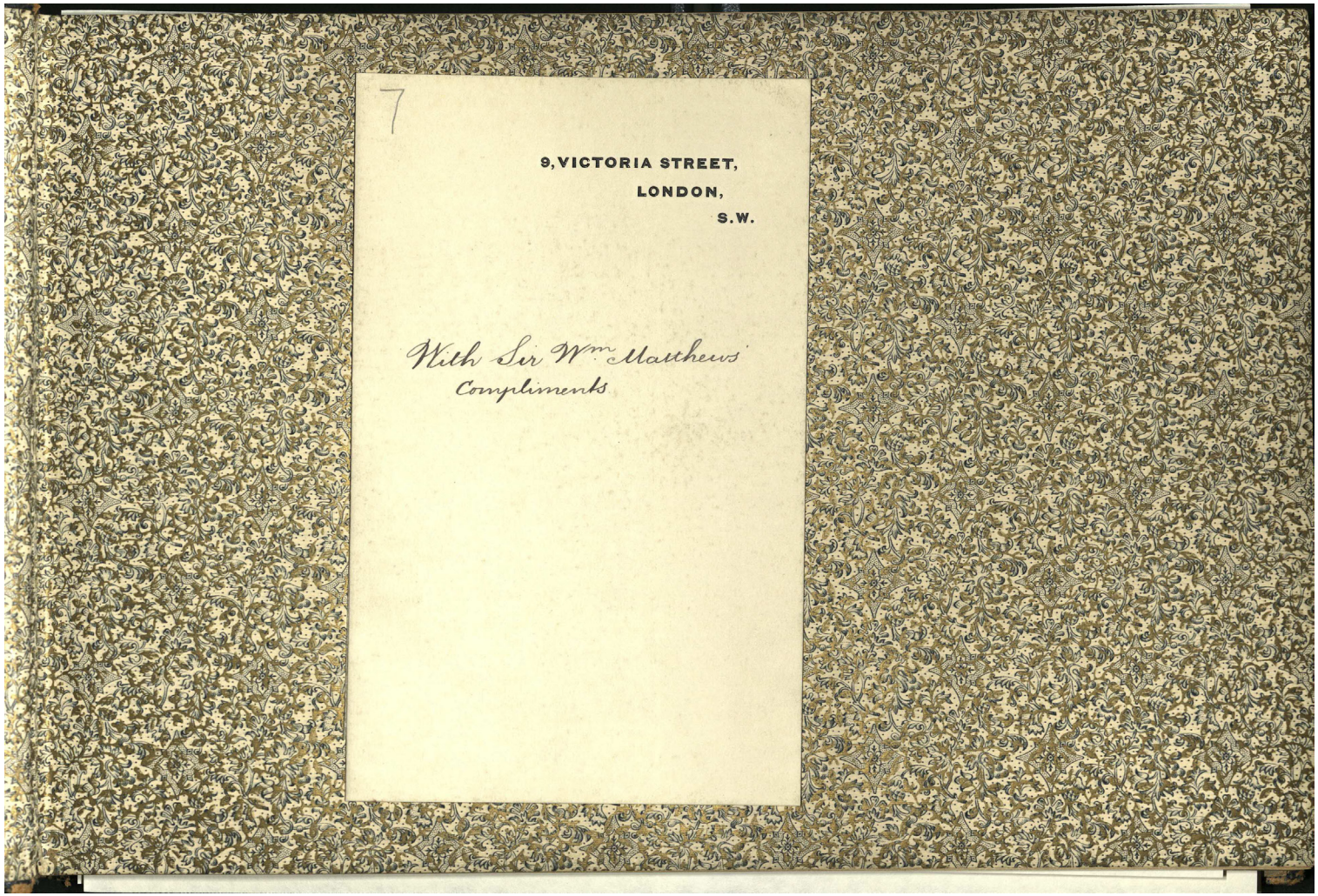


Figure 4.23: Detail of compliment slip addressed to Mr Matthews, 1902-1909

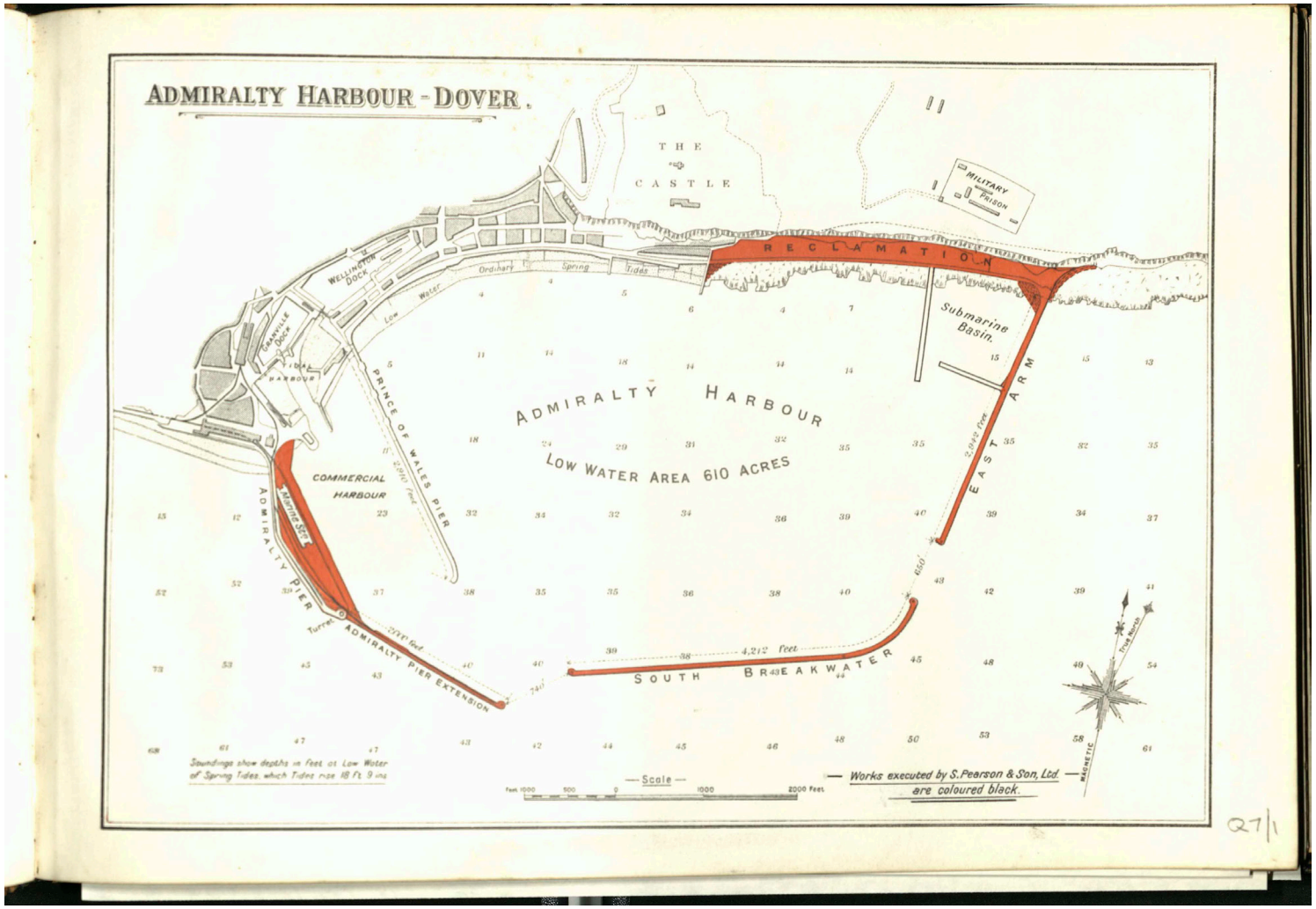


Figure 4.24: Unknown author, “Admiralty Harbour, Dover”, 1902-1909

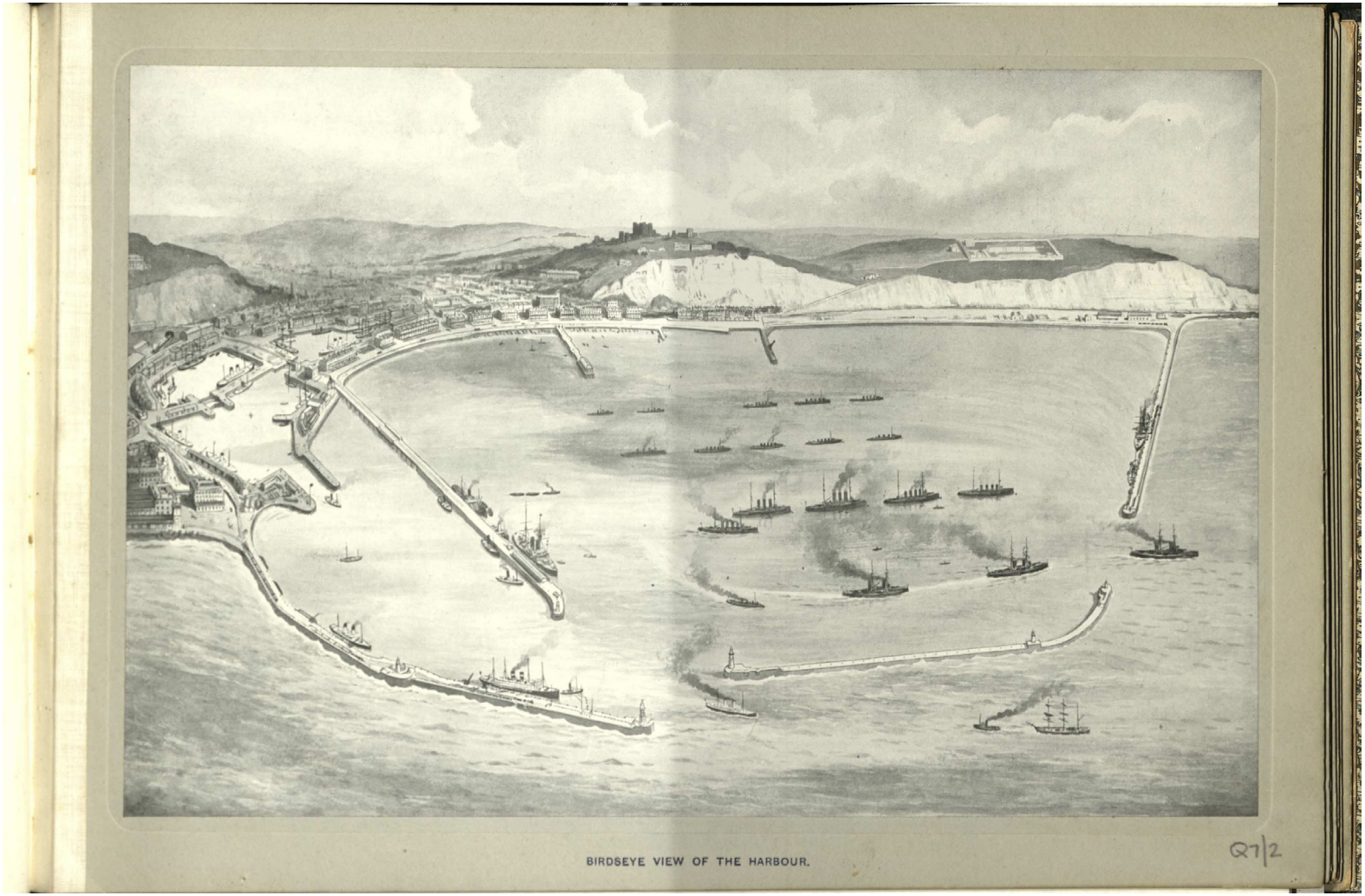
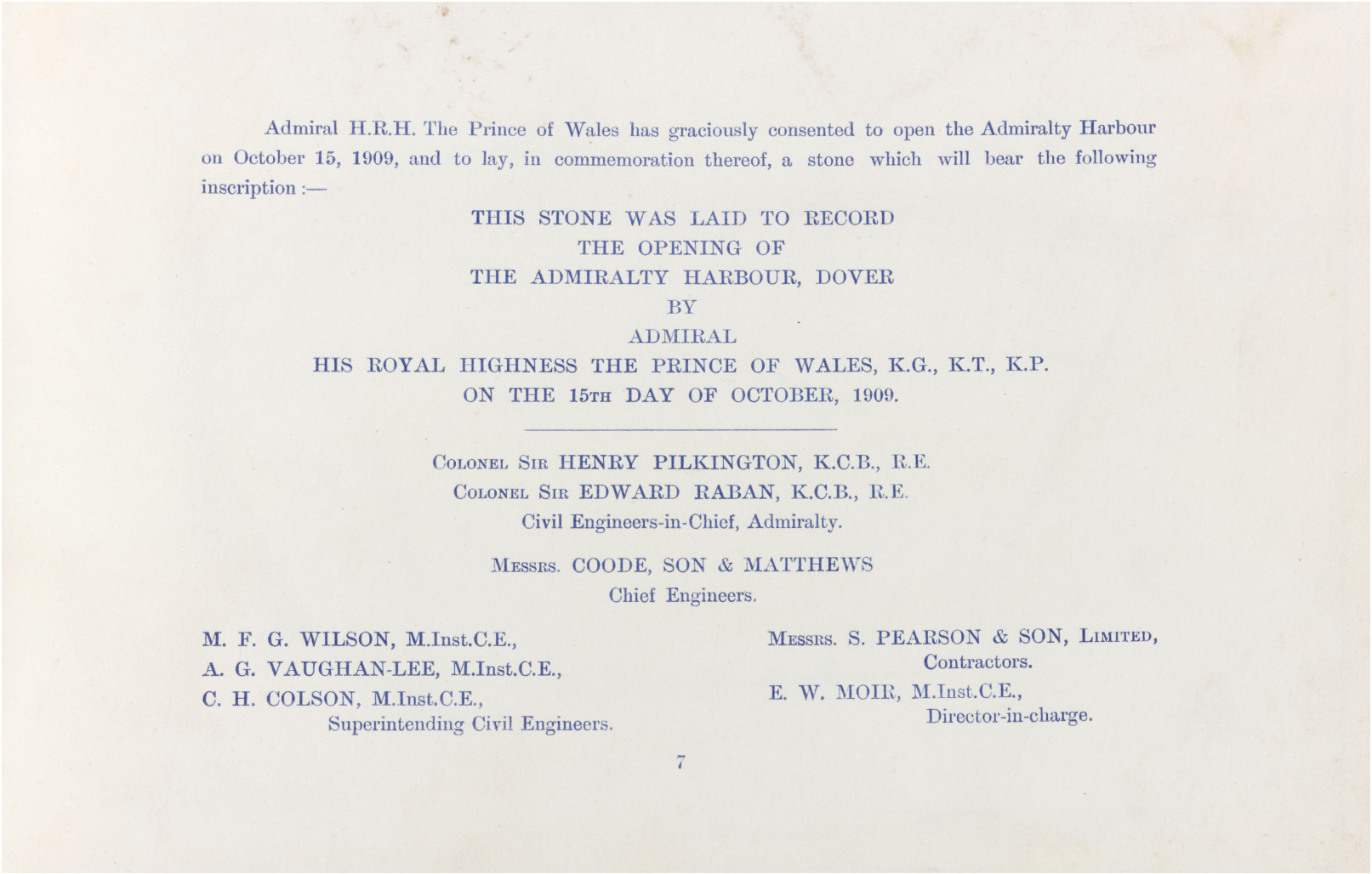


Figure 4.25: Unknown author, a lithograph presenting a Bird's eye view of the harbour, 1902-1909



Admiral H.R.H. The Prince of Wales has graciously consented to open the Admiralty Harbour on October 15, 1909, and to lay, in commemoration thereof, a stone which will bear the following inscription :—

THIS STONE WAS LAID TO RECORD
THE OPENING OF
THE ADMIRALTY HARBOUR, DOVER
BY
ADMIRAL
HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G., K.T., K.P.
ON THE 15TH DAY OF OCTOBER, 1909.

COLONEL SIR HENRY PILKINGTON, K.C.B., R.E.
COLONEL SIR EDWARD RABAN, K.C.B., R.E.
Civil Engineers-in-Chief, Admiralty.

MESSRS. COODE, SON & MATTHEWS
Chief Engineers.

M. F. G. WILSON, M.Inst.C.E.,
A. G. VAUGHAN-LEE, M.Inst.C.E.,
C. H. COLSON, M.Inst.C.E.,
Superintending Civil Engineers.

MESSRS. S. PEARSON & SON, LIMITED,
Contractors.
E. W. MOIR, M.Inst.C.E.,
Director-in-charge.

7

Figure 4.26: Unknown author, descriptive text, 1902-1909

Figure 4.27: Unknown author, “General view of east workyard” 1902

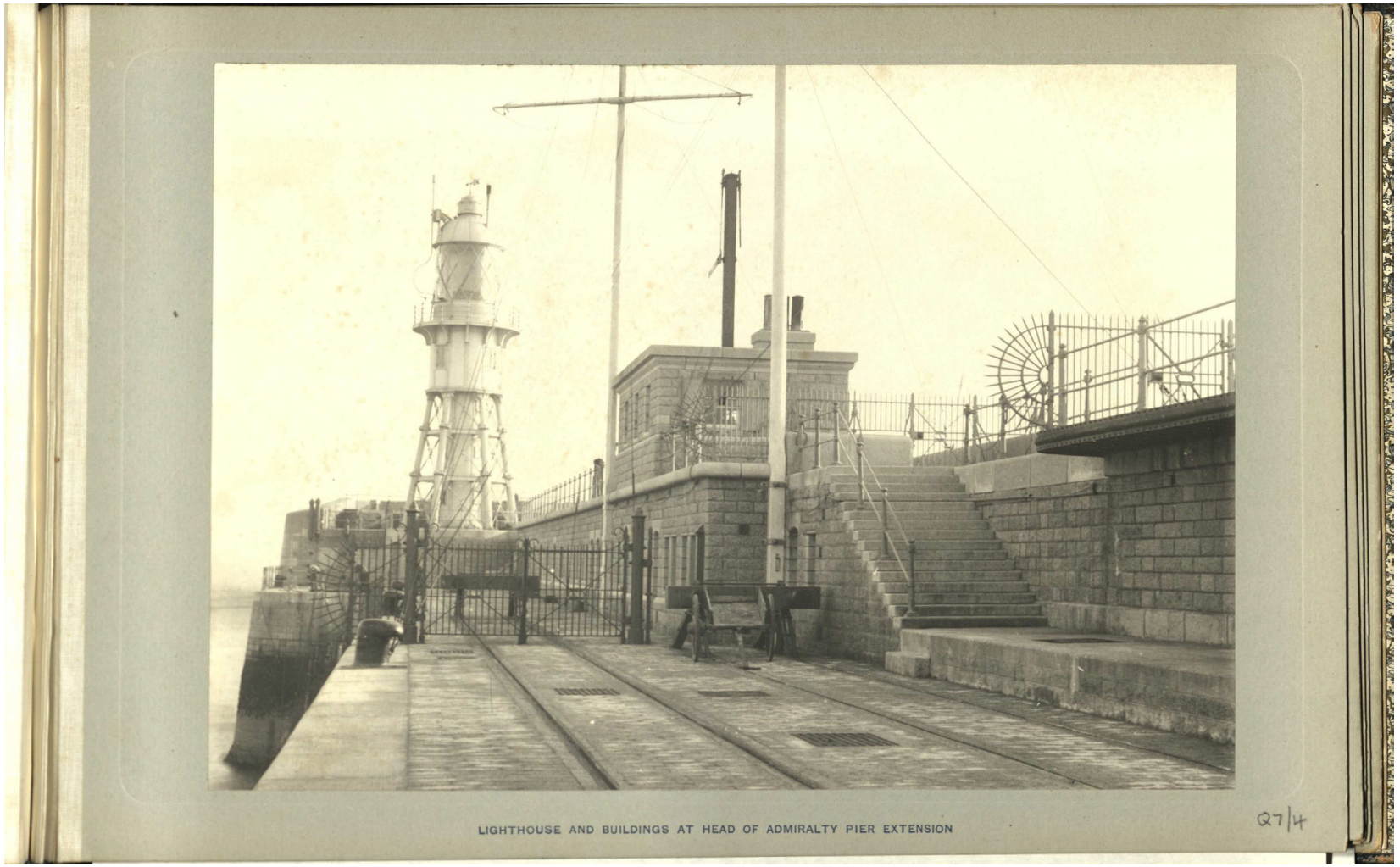


Figure 4.28: Unknown photographer, “Lighthouse and buildings at head of Admiralty Pier extension” 1902

Figure 4.29: Unknown author, “General view of Admiralty Pier extension, from lighthouse”, 1902

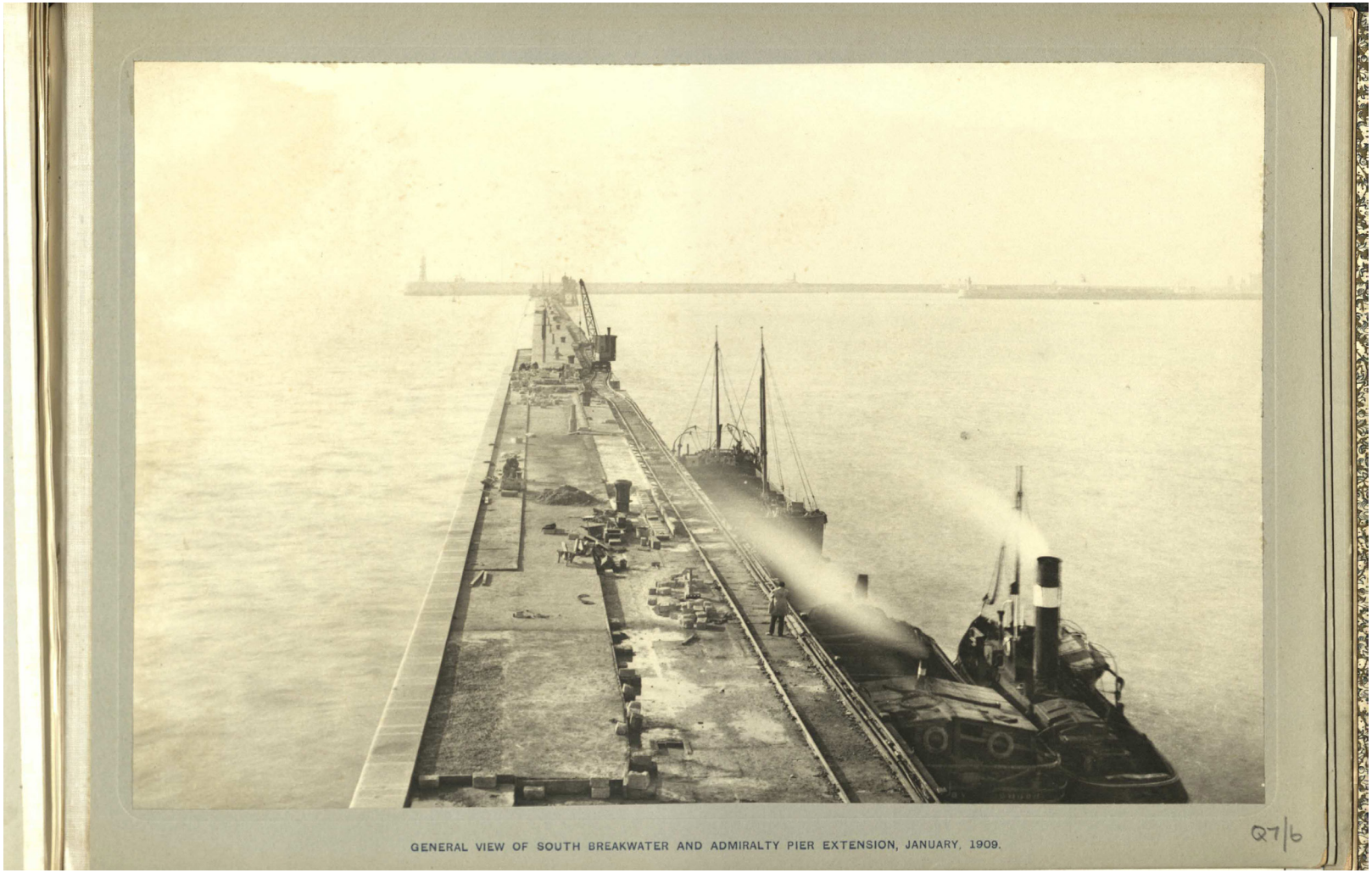


Figure 4.30: Unknown author, “General view of south breakwater and Admiralty Pier extension” 1909

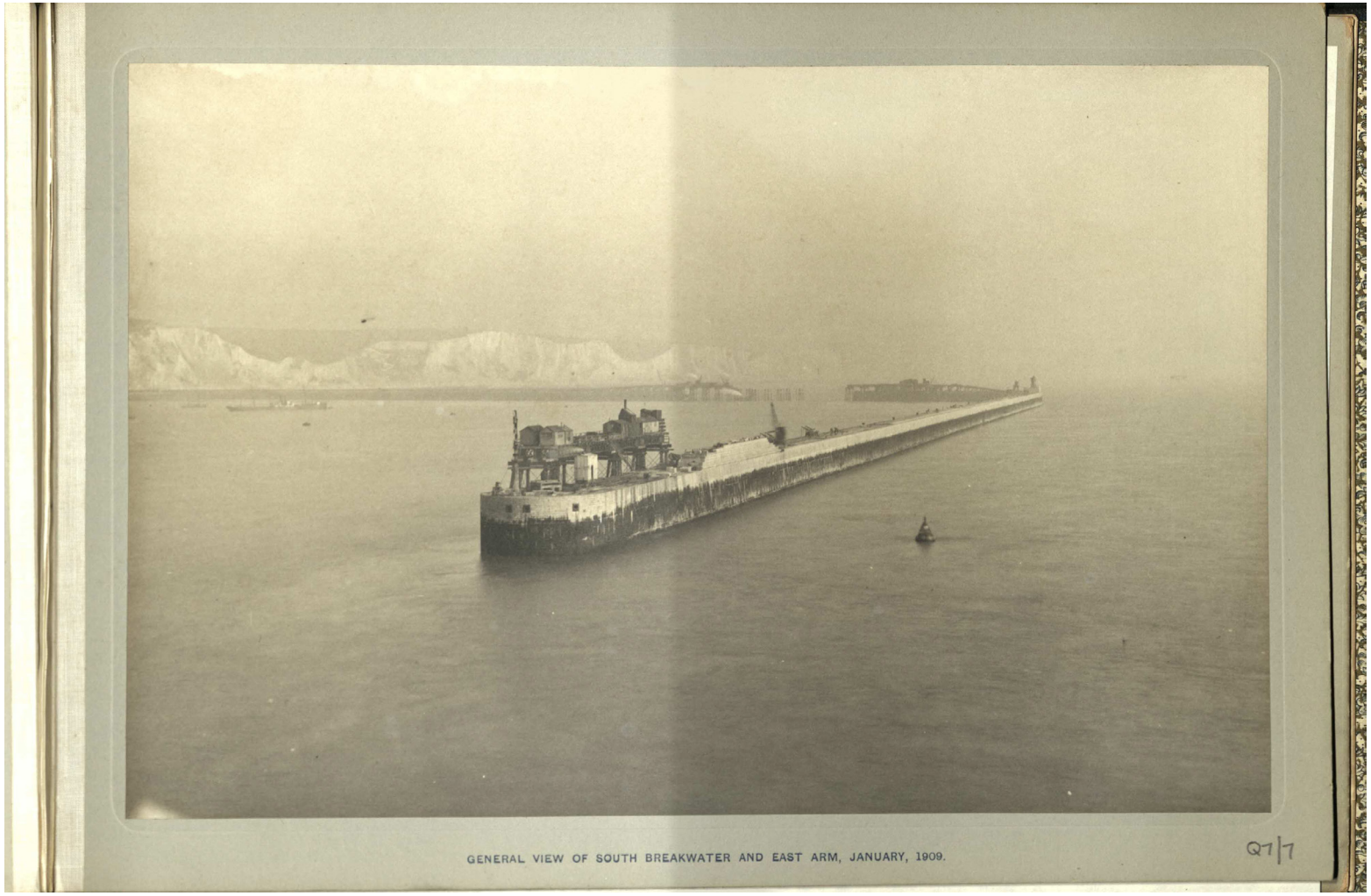


Figure 4.31: Unknown author, “General view of south breakwater and east arm” 1909

Figure 4.32: Unknown author, "H.M. battleships 'Ablemarle', 'Cornwallis', 'Queen', and 'Albion', leaving the harbour"1909

Appendix D: Sample of a Portfolio album

PEA Q39, “Miscellaneous Pearson Works” 1892-1911

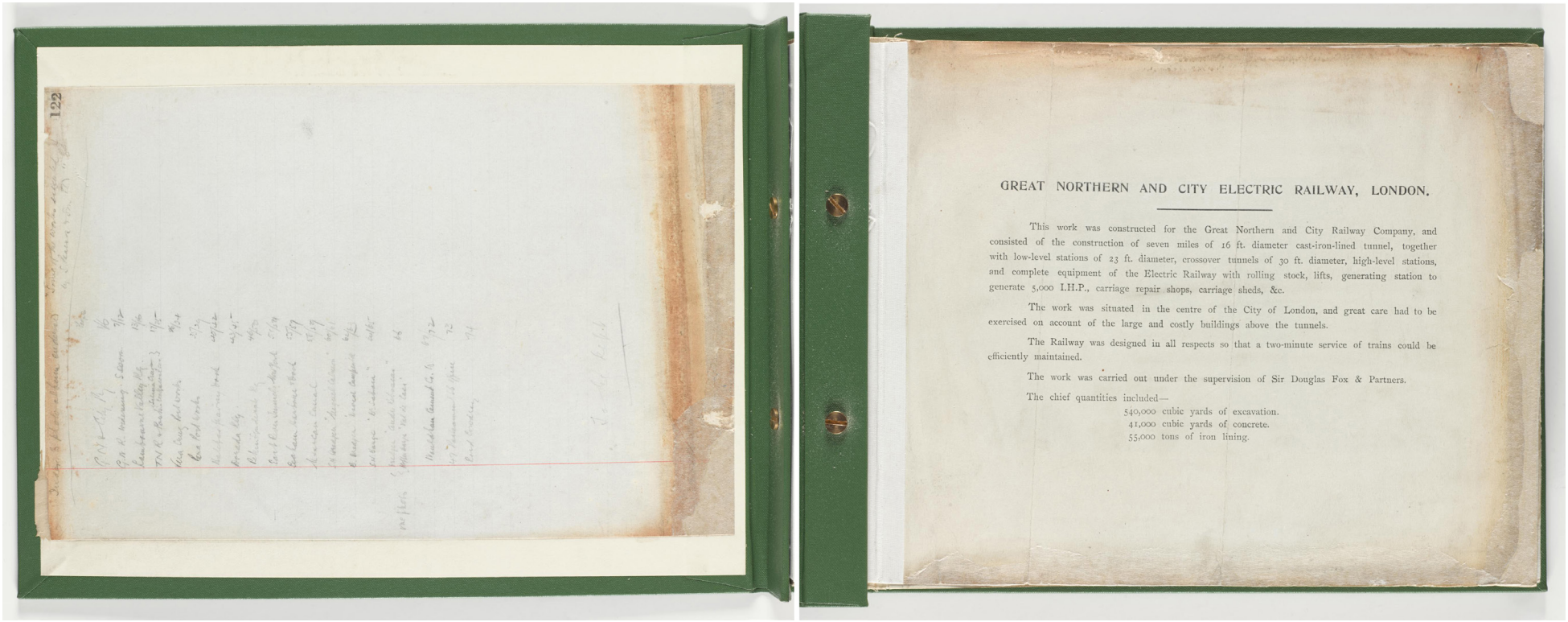
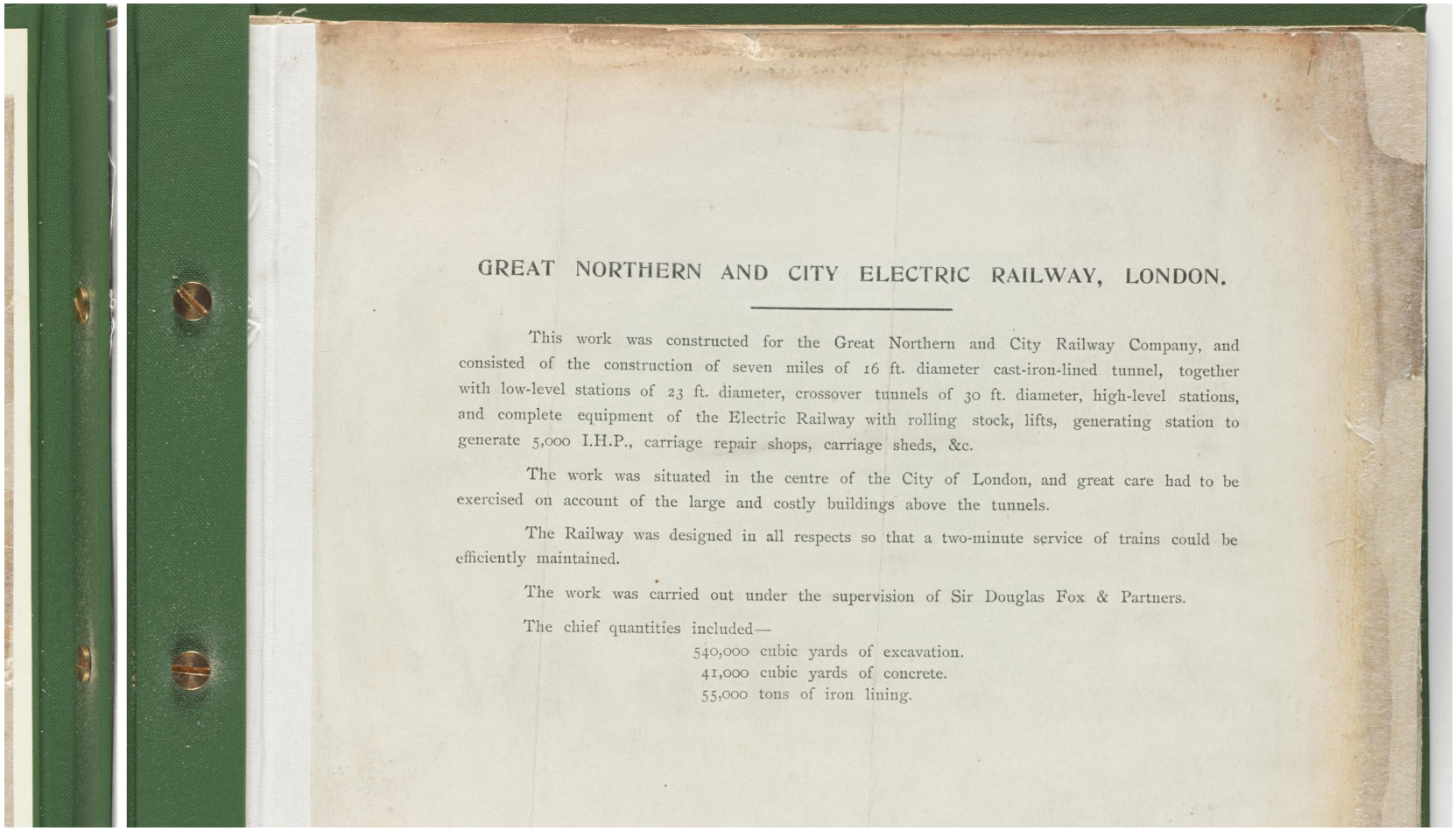


Figure 4.33: Unknown author, album cover and “Great Northern and City Railway, London”



GREAT NORTHERN AND CITY ELECTRIC RAILWAY, LONDON.

This work was constructed for the Great Northern and City Railway Company, and consisted of the construction of seven miles of 16 ft. diameter cast-iron-lined tunnel, together with low-level stations of 23 ft. diameter, crossover tunnels of 30 ft. diameter, high-level stations, and complete equipment of the Electric Railway with rolling stock, lifts, generating station to generate 5,000 I.H.P., carriage repair shops, carriage sheds, &c.

The work was situated in the centre of the City of London, and great care had to be exercised on account of the large and costly buildings above the tunnels.

The Railway was designed in all respects so that a two-minute service of trains could be efficiently maintained.

The work was carried out under the supervision of Sir Douglas Fox & Partners.

The chief quantities included—

540,000 cubic yards of excavation.
41,000 cubic yards of concrete.
55,000 tons of iron lining.

Figure 4.34 (detail from figure 4.33): Opening page Great Northern and City Railway

Figure 4.35: Unknown author, “the Right Hon. LORD COWDRAY, president of Messrs S. Pearson & Son Ltd”,

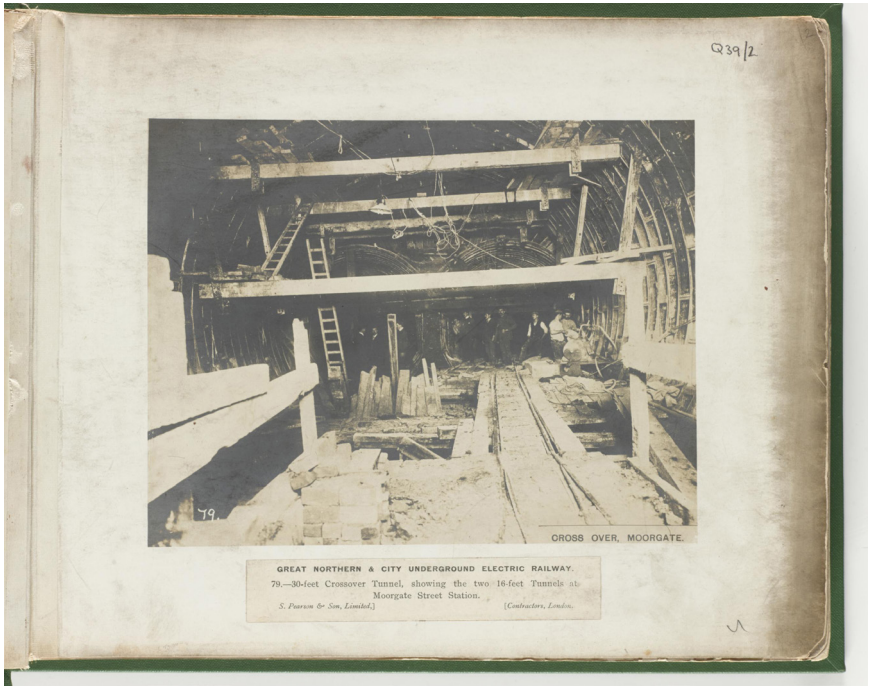


Figure 4.36: Unknown author, “30-feet crossover tunnel, showing the two 16- feet tunnels at Moorgate Street station”

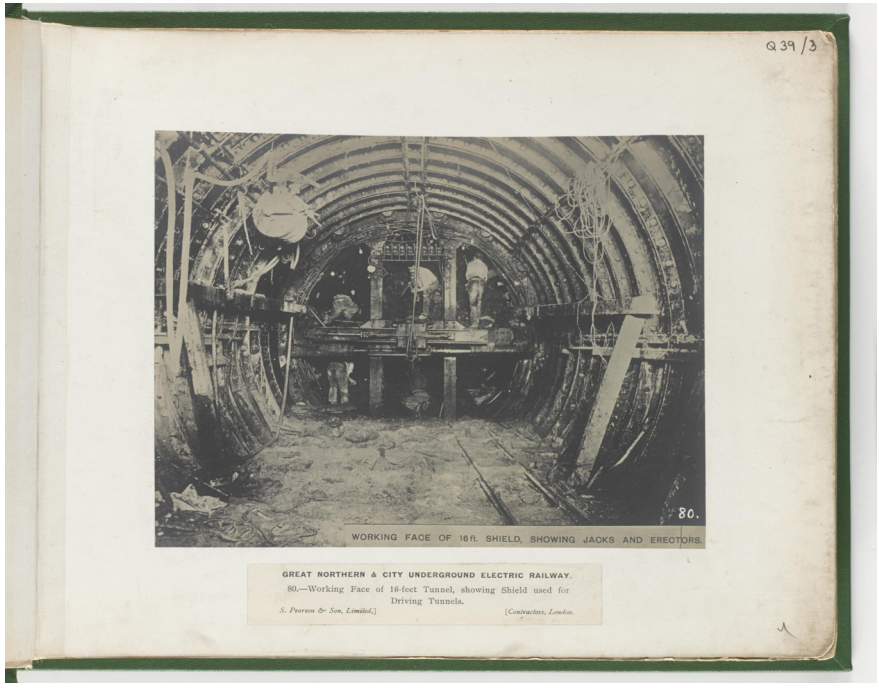


Figure 4.37: Unknown author, “Working face of 16-feet tunnel, showing shield used for driving tunnels”

Figure 4.38: Moorgate Street Underground Station

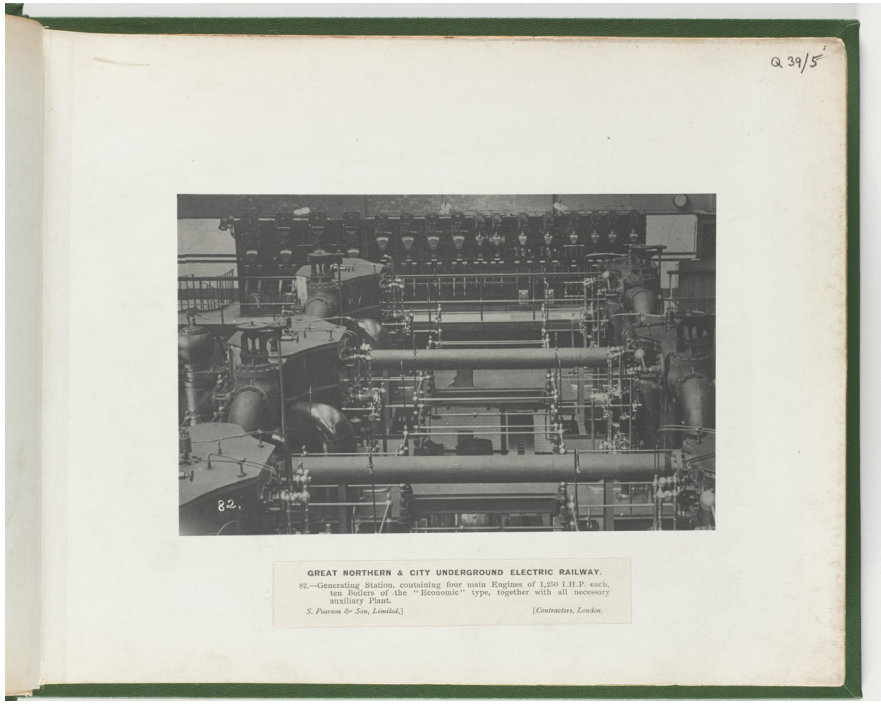


Figure 4.39: Unknown author, "Generating station, containing four main engines of 1,250 I.H.P each, ten boilers of the 'Economic' type, together with all necessary auxiliary plant"

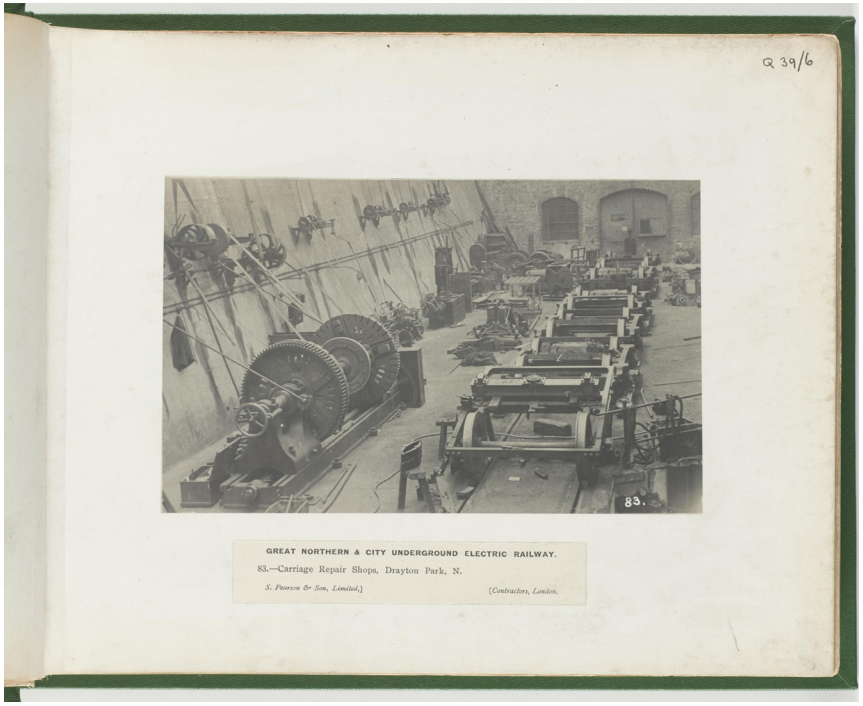


Figure 4.40: Unknown author, “Carriage repair shops, Drayton Park”

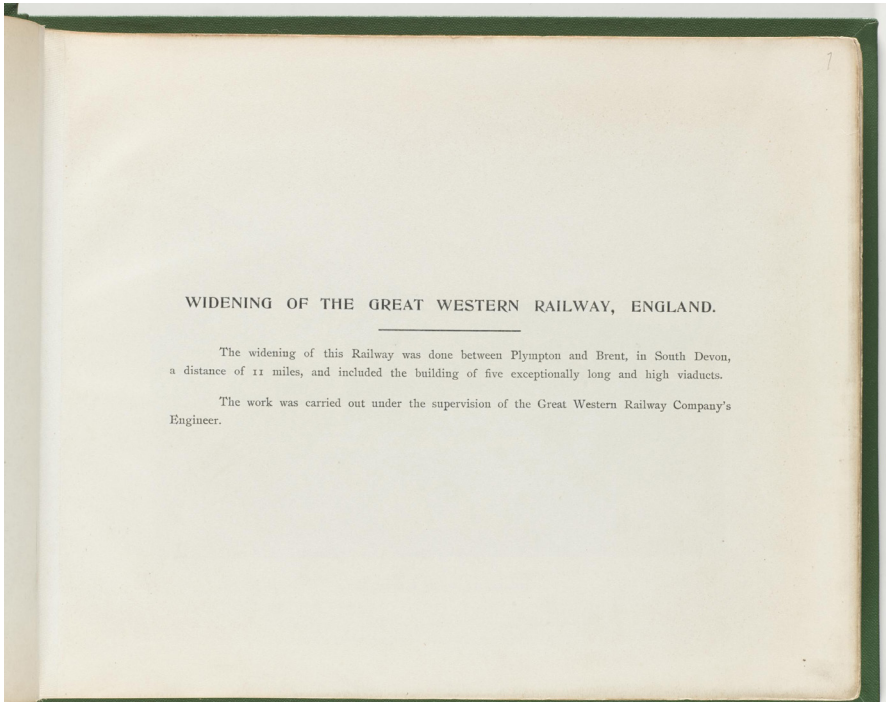


Figure 4.41: “Widening of the Great Western Railway, England. South Devon doubling”

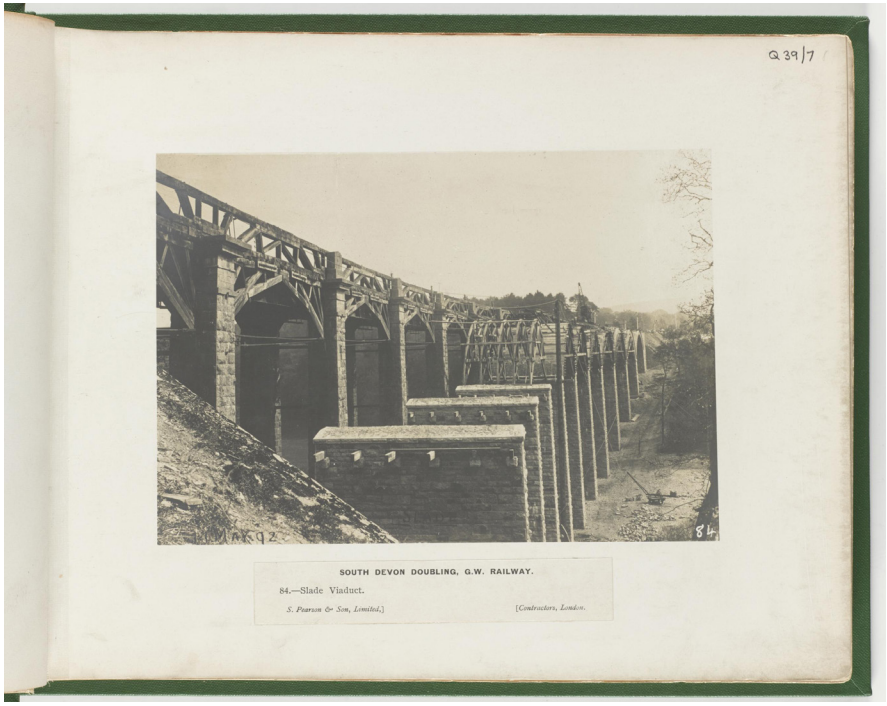


Figure 4.42: Unknown author, “Slade viaduct”, 1892

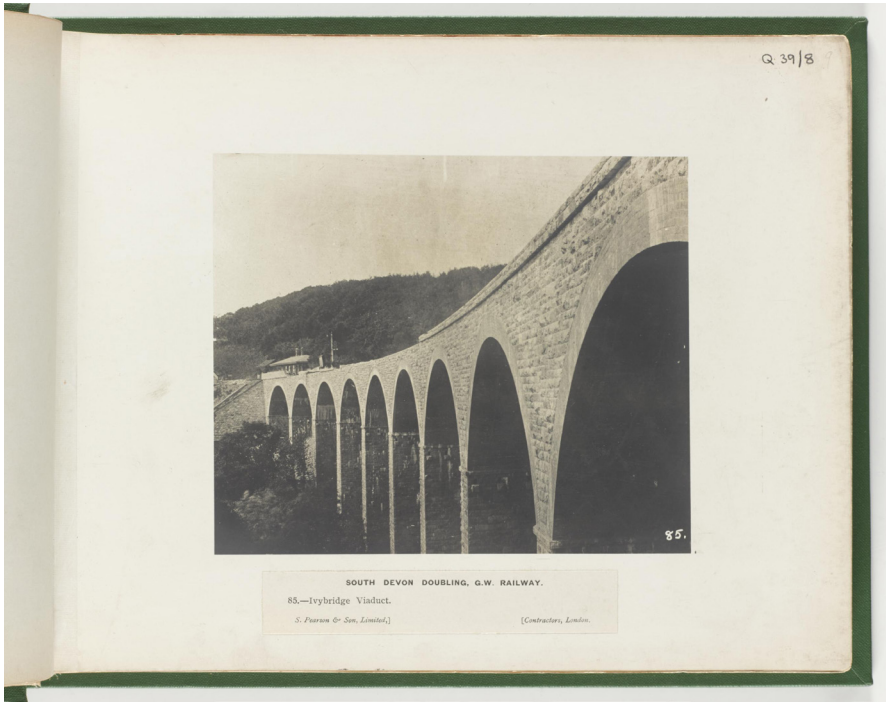


Figure 4.43: Unknown author, “Ivybridge viaduct”, 1892

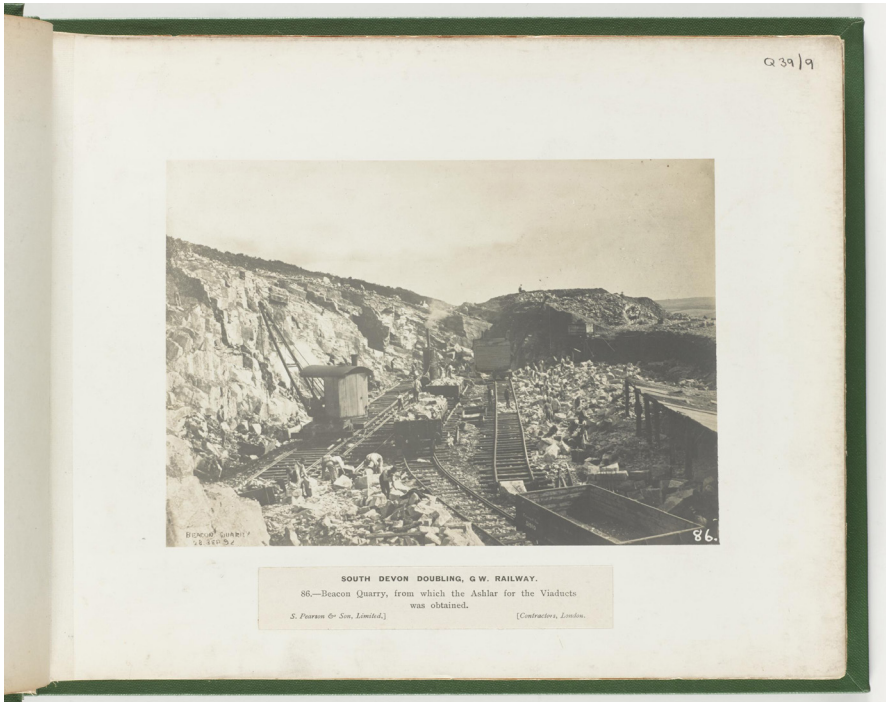


Figure 4.44: Unknown author, “Beacon quarry, from which the Ashlar for the viaducts was obtained”, 1892

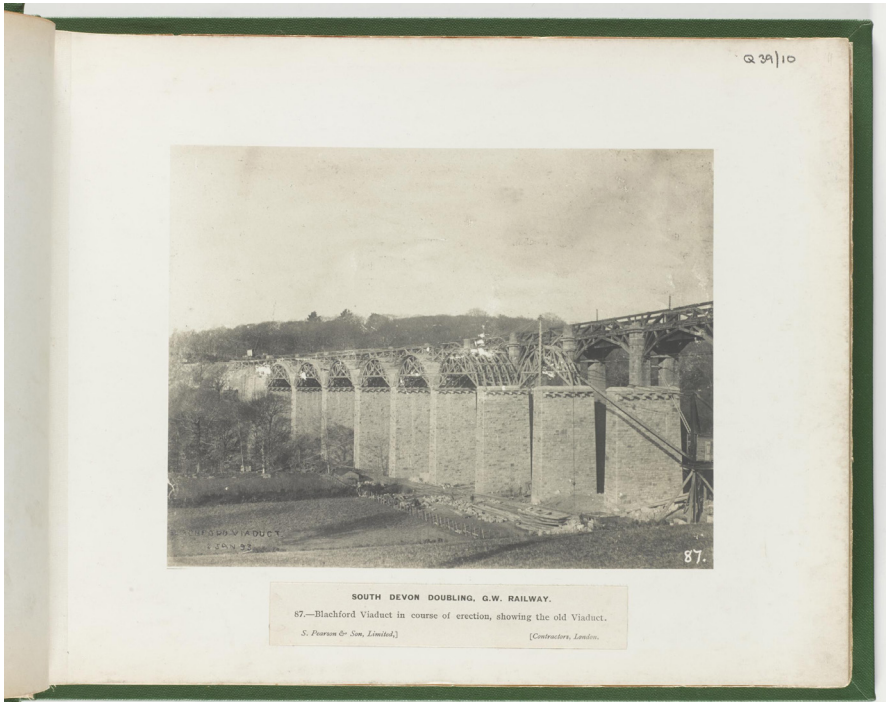


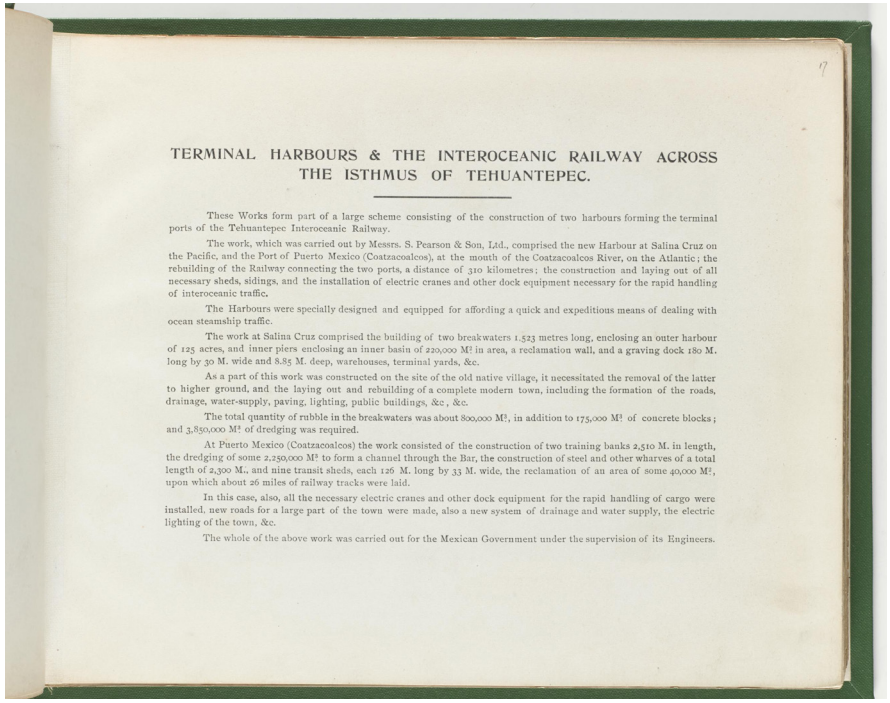
Figure 4.45: Unknown author, “Blachford viaduct in course of erection, showing the old viaduct”, 1893

Figure 4.46: Unknown author, “Blachford viaduct completed”, 1893

Image 4.47: Unknown author, “Lambourne Valley (light) railway, England. Newbury station”

Figure 4.48: Unknown author, “Viaduct over River Kennett”

Figure 4.49: Unknown author, “Lambourne goods yard”



TERMINAL HARBOURS & THE INTEROCEANIC RAILWAY ACROSS THE ISTHMUS OF TEHUANTEPEC.

These Works form part of a large scheme consisting of the construction of two harbours forming the terminal ports of the Tehuantepec Interoceanic Railway.

The work, which was carried out by Messrs. S. Pearson & Son, Ltd., comprised the new Harbour at Salina Cruz on the Pacific, and the Port of Puerto Mexico (Coatzacoalcos), at the mouth of the Coatzacoalcos River, on the Atlantic; the rebuilding of the Railway connecting the two ports, a distance of 310 kilometres; the construction and laying out of all necessary sheds, sidings, and the installation of electric cranes and other dock equipment necessary for the rapid handling of interoceanic traffic.

The Harbours were specially designed and equipped for affording a quick and expeditious means of dealing with ocean steamship traffic.

The work at Salina Cruz comprised the building of two breakwaters 1,523 metres long, enclosing an outer harbour of 125 acres, and inner piers enclosing an inner basin of 220,000 M² in area, a reclamation wall, and a graving dock 180 M. long by 30 M. wide and 8.85 M. deep, warehouses, terminal yards, &c.

As a part of this work was constructed on the site of the old native village, it necessitated the removal of the latter to higher ground, and the laying out and rebuilding of a complete modern town, including the formation of the roads, drainage, water-supply, paving, lighting, public buildings, &c., &c.

The total quantity of rubble in the breakwaters was about 800,000 M³, in addition to 175,000 M³ of concrete blocks; and 3,850,000 M³ of dredging was required.

At Puerto Mexico (Coatzacoalcos) the work consisted of the construction of two training banks 2,510 M. in length, the dredging of some 2,250,000 M³ to form a channel through the Bar, the construction of steel and other wharves of a total length of 2,300 M., and nine transit sheds, each 126 M. long by 33 M. wide, the reclamation of an area of some 40,000 M², upon which about 26 miles of railway tracks were laid.

In this case, also, all the necessary electric cranes and other dock equipment for the rapid handling of cargo were installed, new roads for a large part of the town were made, also a new system of drainage and water supply, the electric lighting of the town, &c.

The whole of the above work was carried out for the Mexican Government under the supervision of its Engineers.

Figure 4.50: “Terminal harbours & the interoceanic railway across the Isthmus of Tehuantepec. Port of Salina Cruz, Mexico”

PORT OF SALINA CRUZ, MEXICO.

94.—General View of Harbour during construction.

S. Pearson & Son, Limited.] [*Contractors, London.*

Figure 4.51: Eden Von Düben, “General view of harbour during construction”

Figure 4.52: Unknown author, “East breakwater under construction showing Pell-mell blocks and titan crane”, 1904

Figure 4.53: Unknown author, “Entrance to inner basin, showing warehouses in course of construction on monolith wall”, 1908

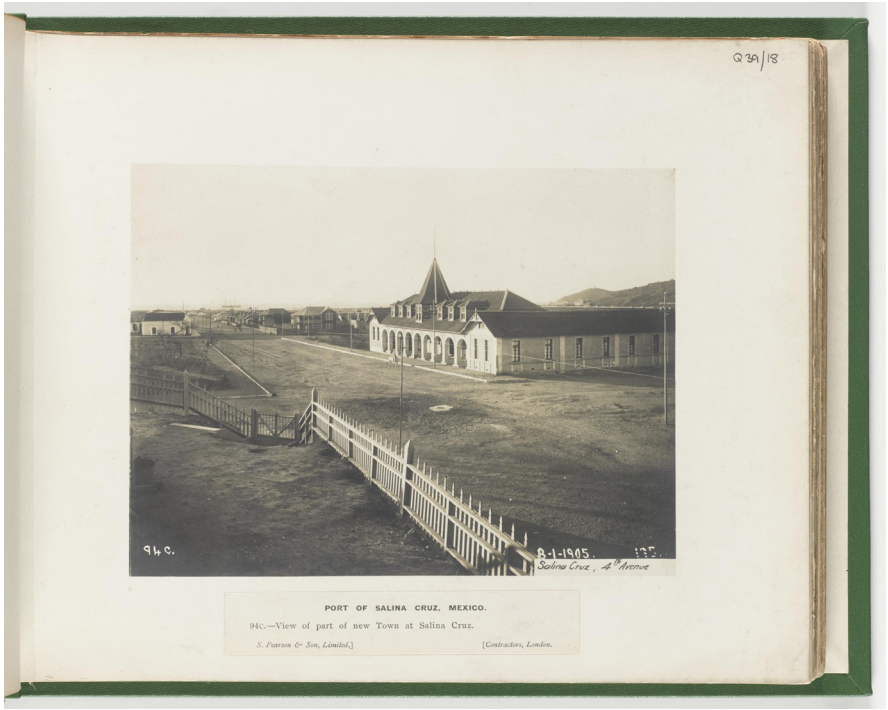


Figure 4.54: Unknown author, “View of New Town at Salina Cruz”, 1905

Figure 4.55: Unknown author, “Timber Pier, constructed by contractors for temporary requirements”, 1903

Figure 4.56: Eden Von Düben, “Interior of warehouse on monolith wall”, c. 1906

Figure 4.57: Unknown author, “Port of Coatzoalcos (Puerto Mexico), Mexico”

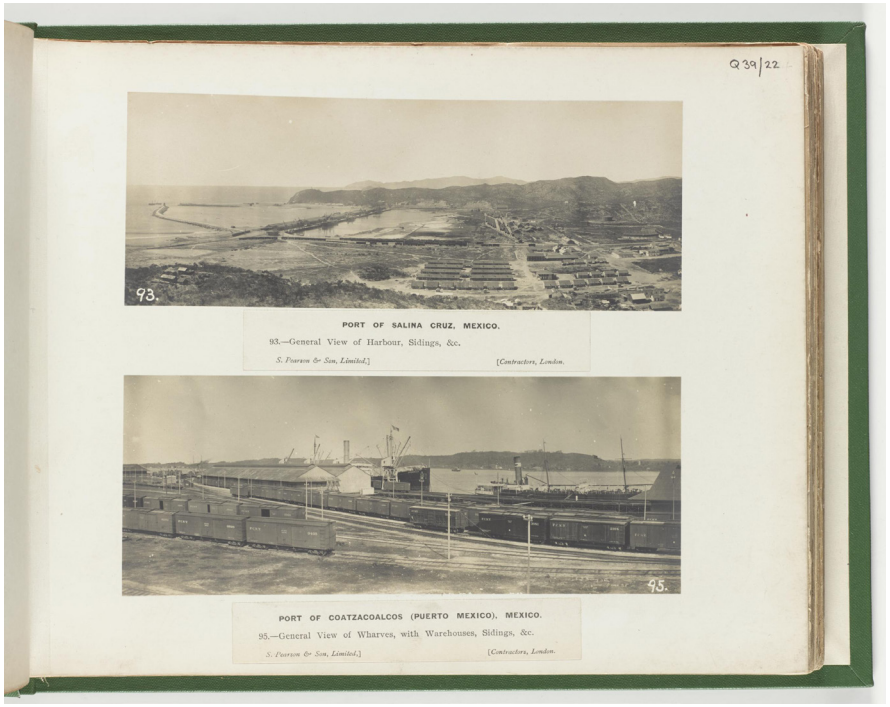


Figure 4.58: Unknown author, two photographs depicting the port of Salina cruz, and the port of Coatzoalcos in Mexico

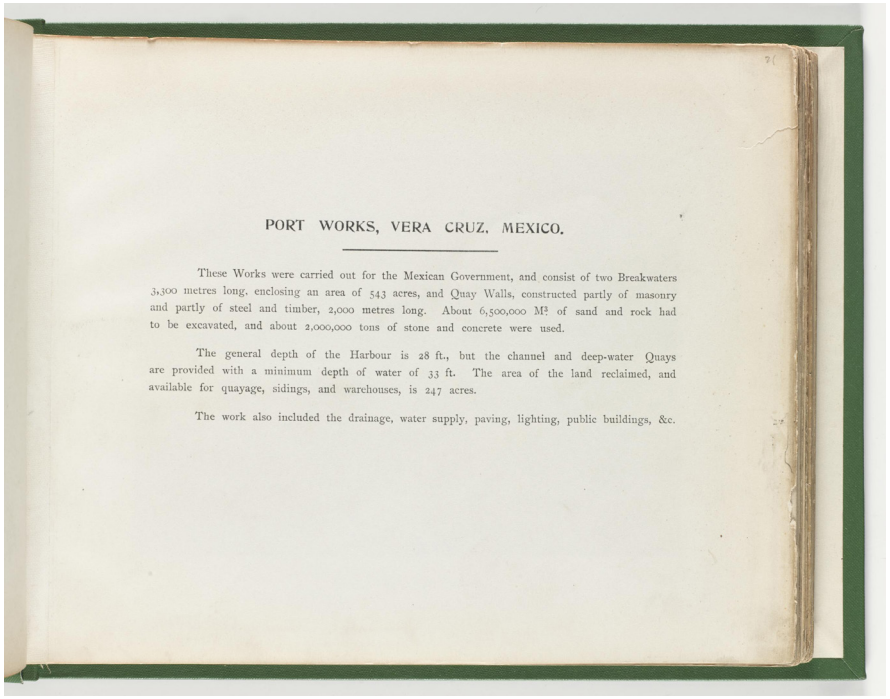


Figure 4.59: Unknown author, “Port works, Vera Cruz, Mexico”

Figure 4.60: Unknown author, “Wall and Blockyard”

Figure 4.61: Unknown author, “General view of Malecon”

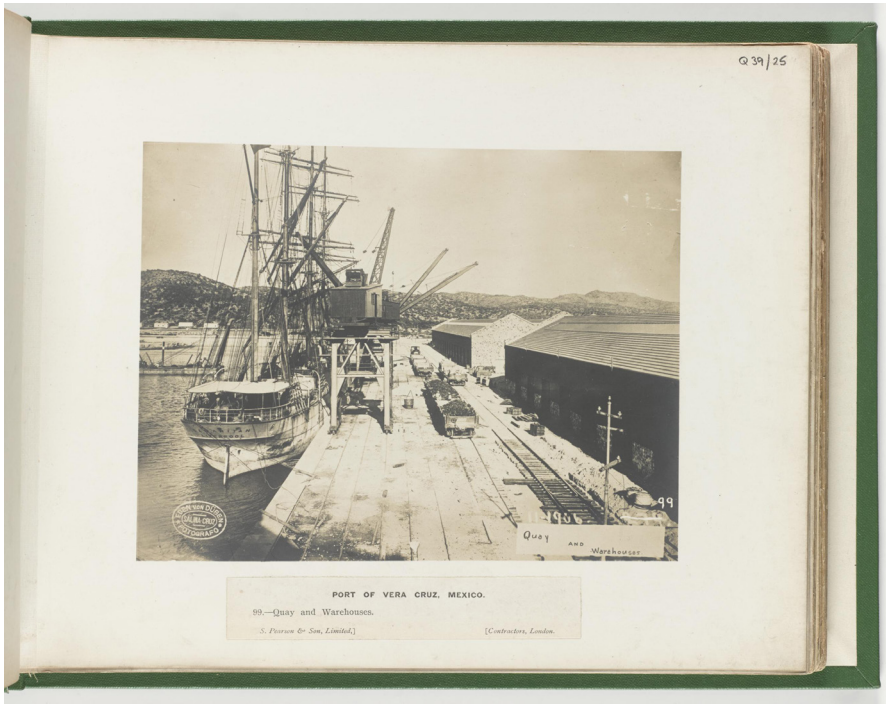


Image 4.62: Eden Von Düben, “Quay and warehouses” 1906

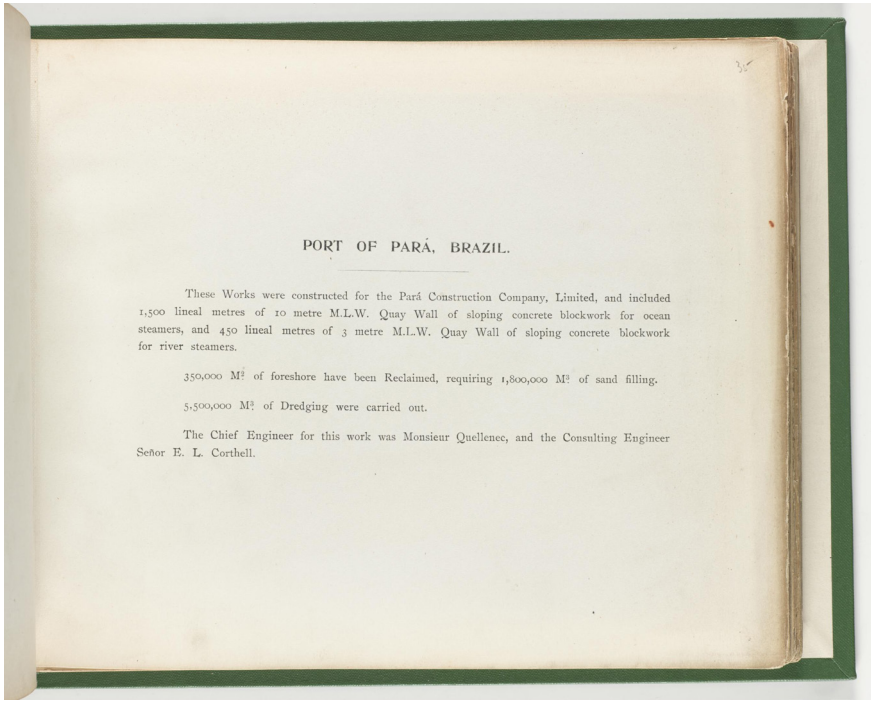
Figure 4.63: Unknown author, “General view of quay wall under construction, showing dredger discharging sand through pontoon pipe line into reclaimed area”

Figure 4.64: Charles Waite, “Outer breakwater, showing Pell-mell blocks tipped on sea side”

Figure 4.65: Unknown author, “Panuela quarry, from which 1,500,00 tons of rubble for the works of the port were obtained”

Figure 4.66: Unknown author, “Floating crane, setting 35-ton concrete blocks”

Figure 4.67: Unknown author, “Dredger discharging sand through pontoon pipe line over quay wall to reclaim land for warehouses, sidings, etc”



PORT OF PARÁ, BRAZIL.

These Works were constructed for the Pará Construction Company, Limited, and included 1,500 lineal metres of 10 metre M.L.W. Quay Wall of sloping concrete blockwork for ocean steamers, and 450 lineal metres of 3 metre M.L.W. Quay Wall of sloping concrete blockwork for river steamers.

350,000 M³ of foreshore have been Reclaimed, requiring 1,800,000 M³ of sand filling.

5,500,000 M³ of Dredging were carried out.

The Chief Engineer for this work was Monsieur Quellenec, and the Consulting Engineer Señor E. L. Corthell.

Figure 4.68: Unknown author, “Port of Para, Brazil”

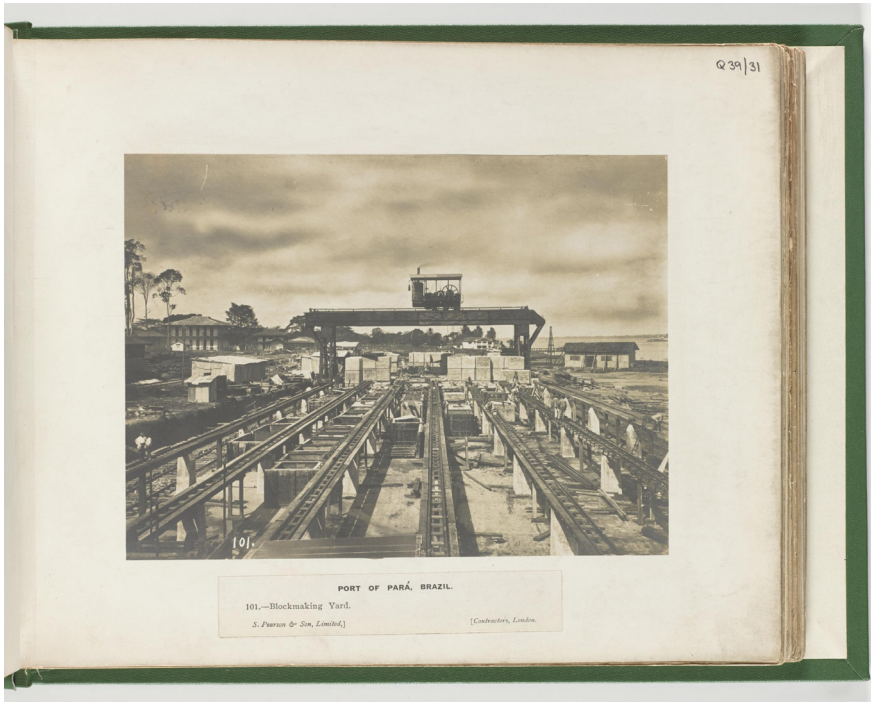


Figure 4.69: Unknown author, “Blockmaking yard”

Figure 4.70: Unknown author, “Quay wall in progress, and sand filling”

Figure 4.71: Unknown author, “Quay wall, 1,950 metres long with warehouses erected on reclaimed area. Depth of water 10 metres at low tide”

Figure 4.72: Unknown photographer, “Quay wall, 1,950 metres long with warehouses in course of construction on reclaimed area. Depth of water 10 metres at low tide”

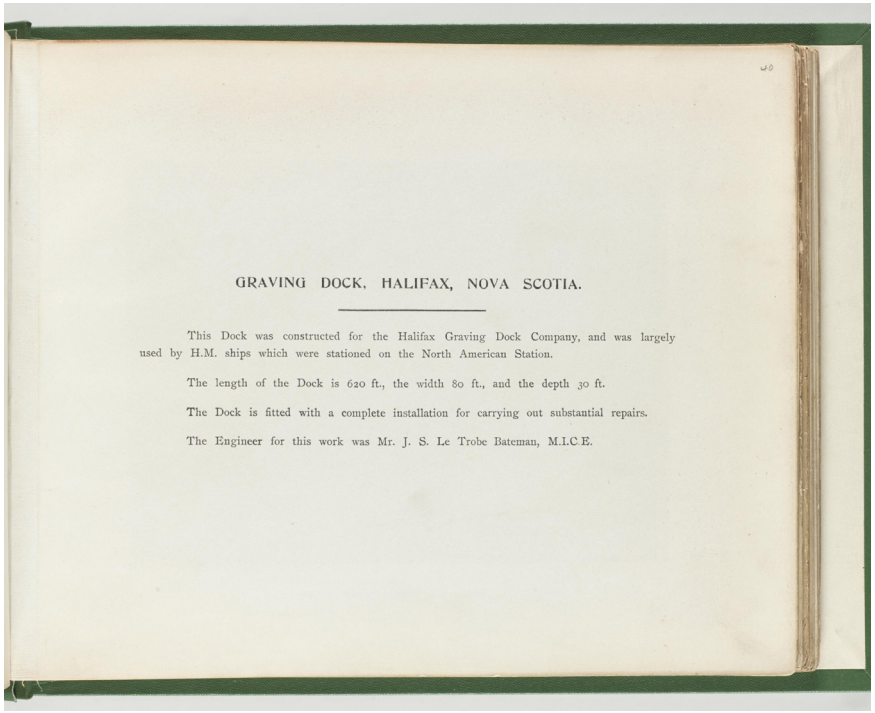


Image 4.73: Unknown author, “Graving dock, Halifax, Nova Scotia”

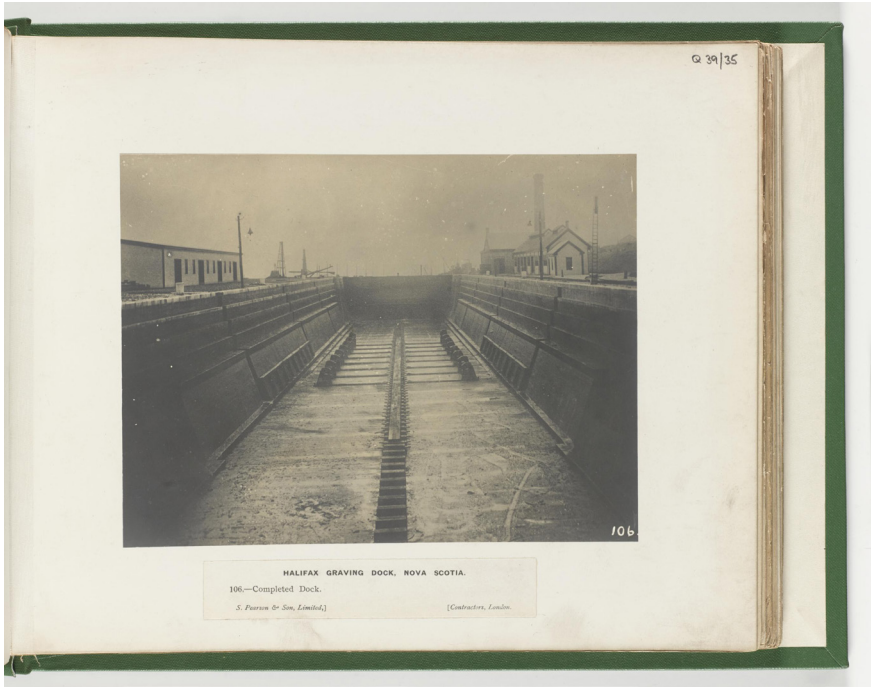


Figure 4.74: Unknown author, “Completed dock”

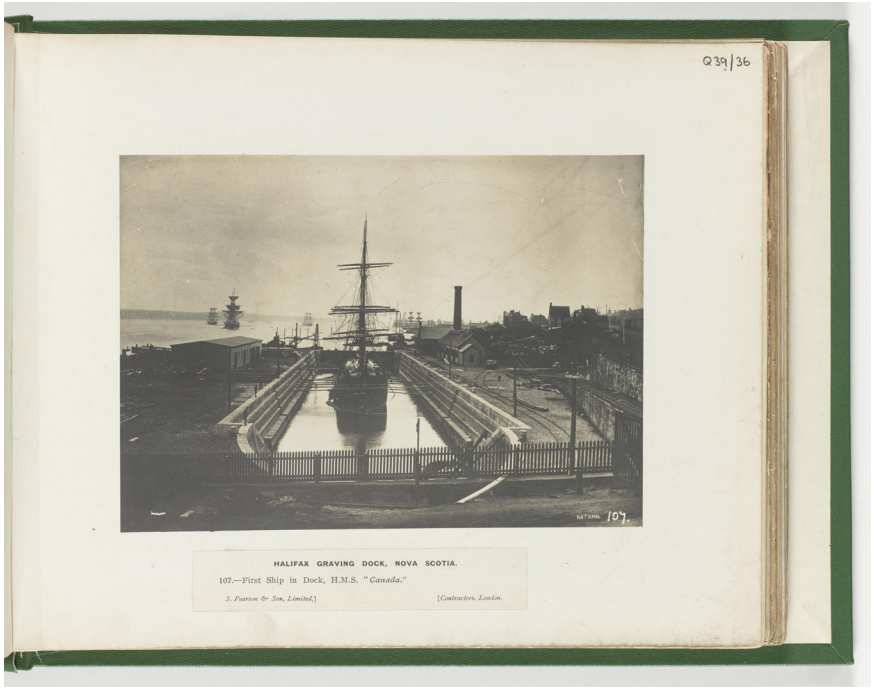
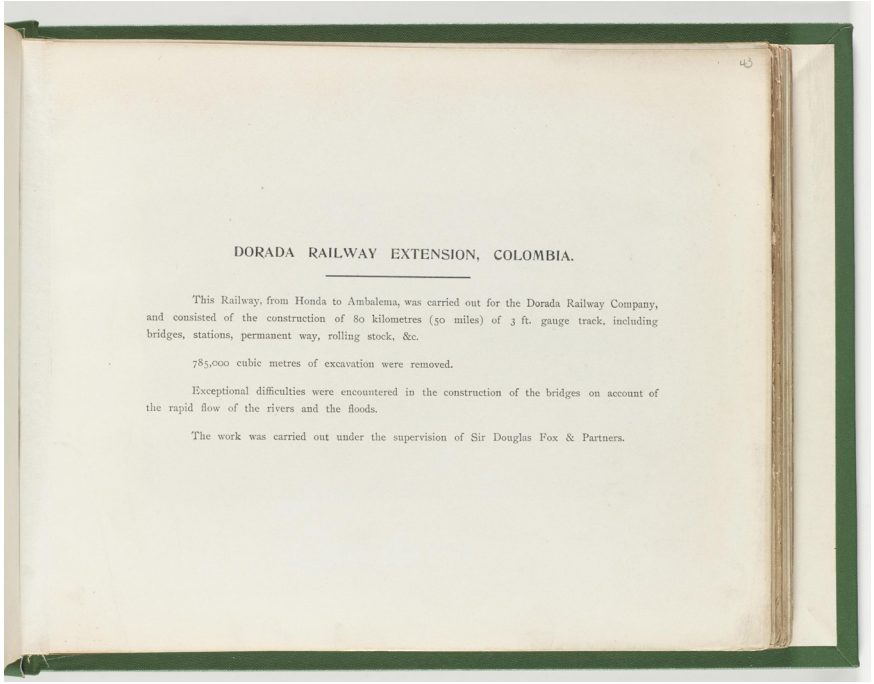


Figure 4.75: Unknown author, “First ship in dock, H.M.S ‘Canada’”



DORADA RAILWAY EXTENSION, COLOMBIA.

This Railway, from Honda to Ambalema, was carried out for the Dorada Railway Company, and consisted of the construction of 80 kilometres (50 miles) of 3 ft. gauge track, including bridges, stations, permanent way, rolling stock, &c.

785,000 cubic metres of excavation were removed.

Exceptional difficulties were encountered in the construction of the bridges on account of the rapid flow of the rivers and the floods.

The work was carried out under the supervision of Sir Douglas Fox & Partners.

Figure 4.76: Unknown author, “Dorada railway extension, Colombia”

Image 4.77: Unknown Unknown author, , “Sabandija River bridge, two spans of 131 feet each”

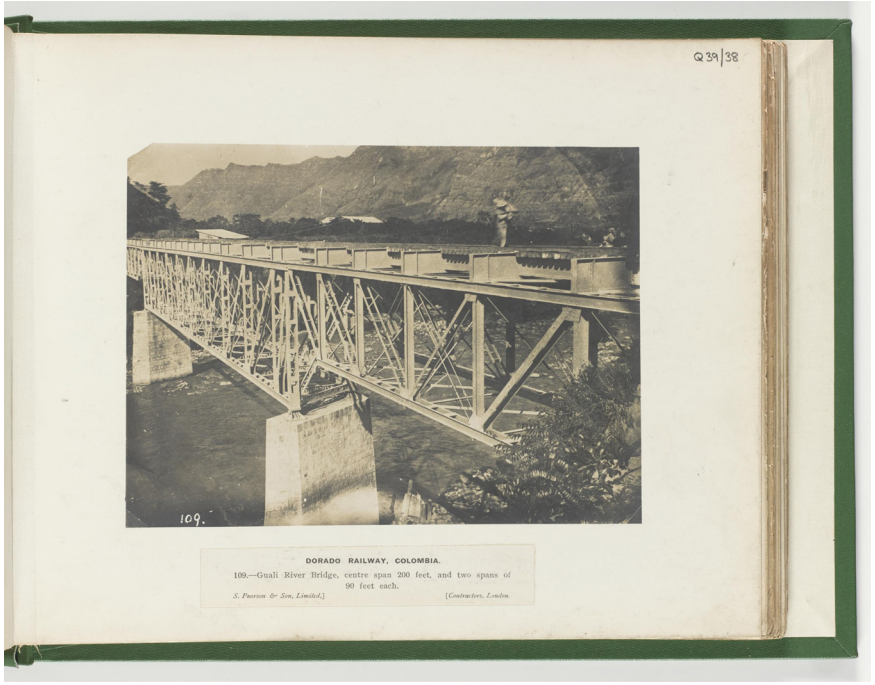


Figure 4.78: Unknown Unknown author, “Guali River bridge, centre span 200 feet, and two spans of 90 feet each”

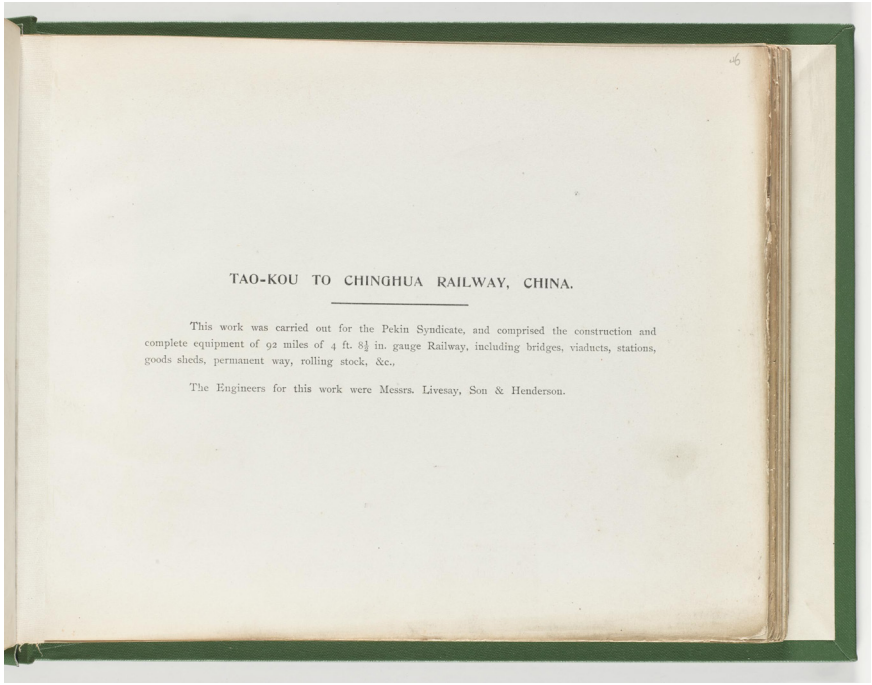


Figure 4.79: Unknown author, “Tao-Kou to Chinghua railway, China. Pekin Syndicate railway”,

Figure 4.80: Unknown author, “Bridged on permanent way”

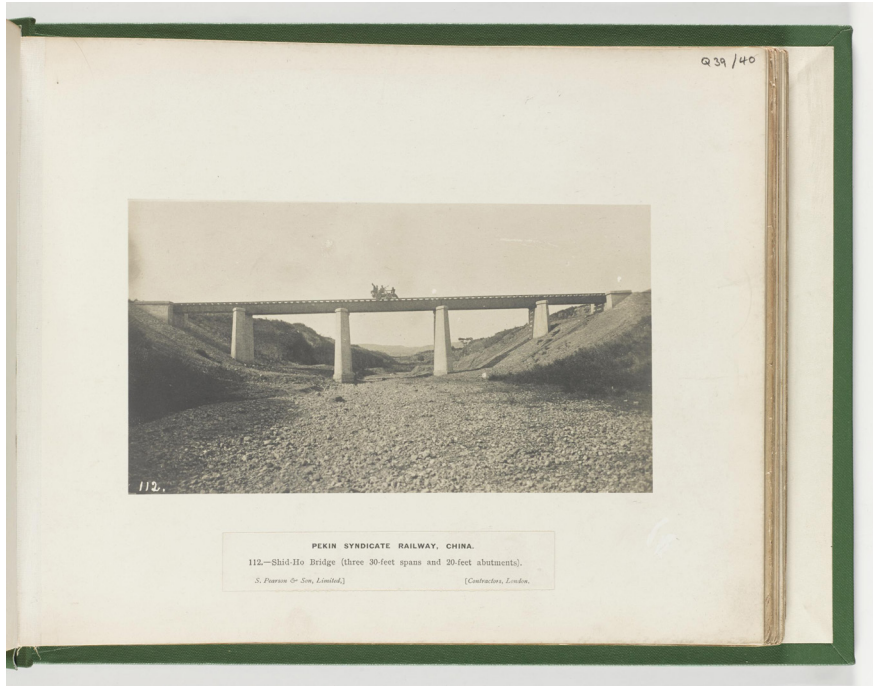


Figure 4.81: Unknown author, “Shid-Ho bridge (three 30-feet spans and 20-feet abutments)”

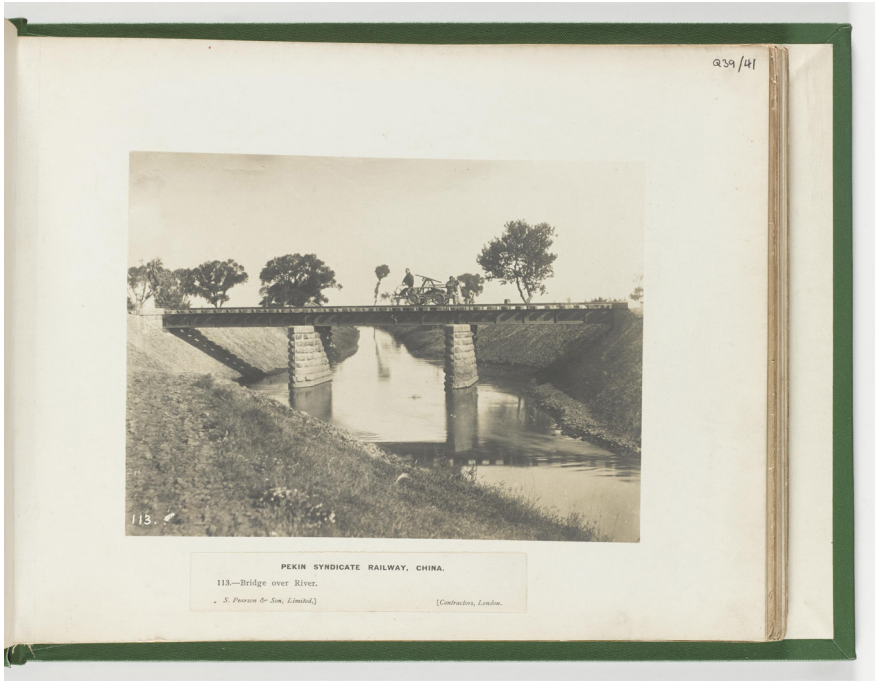
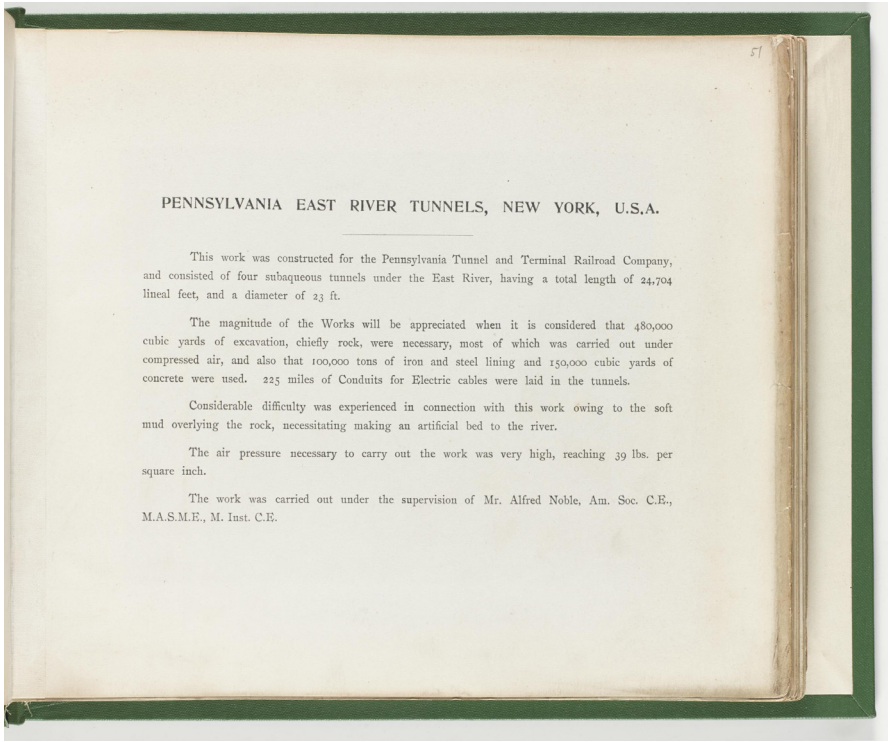


Figure 4.82: Unknown author, “Bridge over river”

Figure 4.83: Unknown author, “Type of station”



PENNSYLVANIA EAST RIVER TUNNELS, NEW YORK, U.S.A.

This work was constructed for the Pennsylvania Tunnel and Terminal Railroad Company, and consisted of four subaqueous tunnels under the East River, having a total length of 24,704 lineal feet, and a diameter of 23 ft.

The magnitude of the Works will be appreciated when it is considered that 480,000 cubic yards of excavation, chiefly rock, were necessary, most of which was carried out under compressed air, and also that 100,000 tons of iron and steel lining and 150,000 cubic yards of concrete were used. 225 miles of Conduits for Electric cables were laid in the tunnels.

Considerable difficulty was experienced in connection with this work owing to the soft mud overlying the rock, necessitating making an artificial bed to the river.

The air pressure necessary to carry out the work was very high, reaching 39 lbs. per square inch.

The work was carried out under the supervision of Mr. Alfred Noble, Am. Soc. C.E., M.A.S.M.E., M. Inst. C.E.

Figure 4.84: Unknown author, “Pennsylvania East river tunnels, New York, U.S.A Pennsylvania Railway”

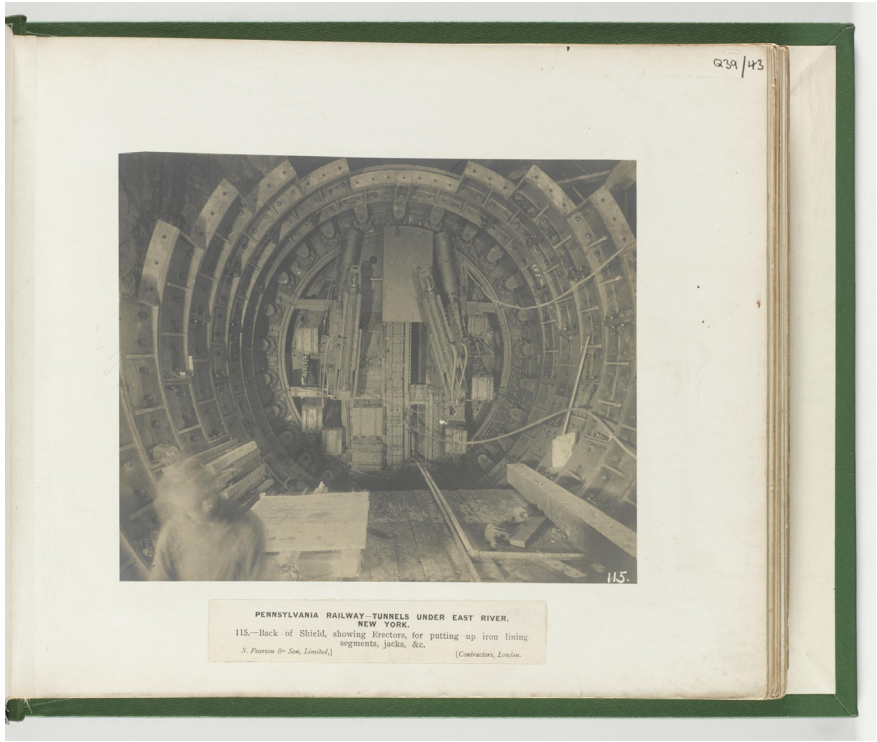


Figure 4.85: Unknown author,, “Back of shield, showing erectors for putting up iron lining segments, jacks etc”

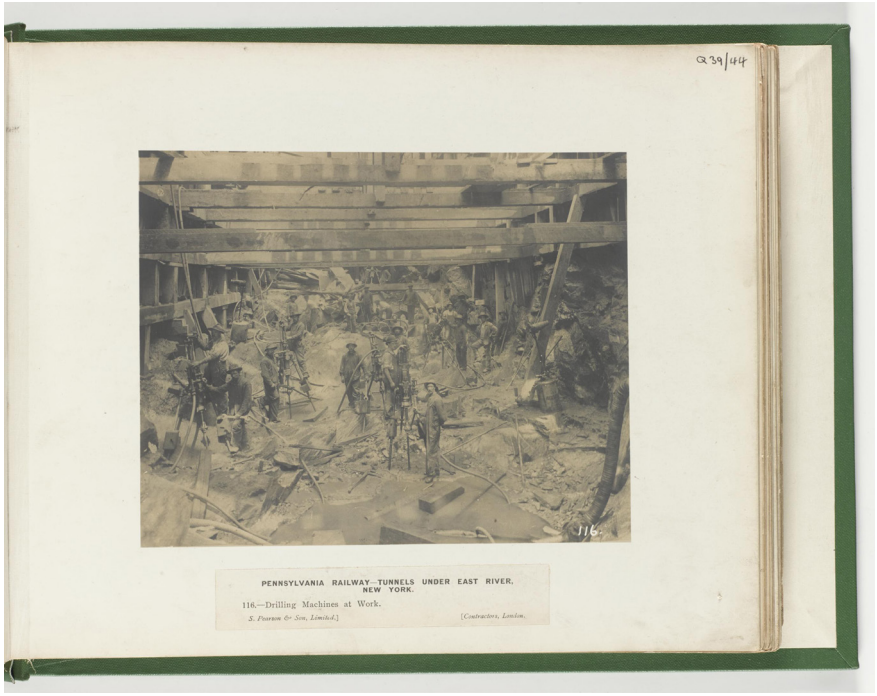


Figure 4.86: Unknown author, “Drilling machine at work”

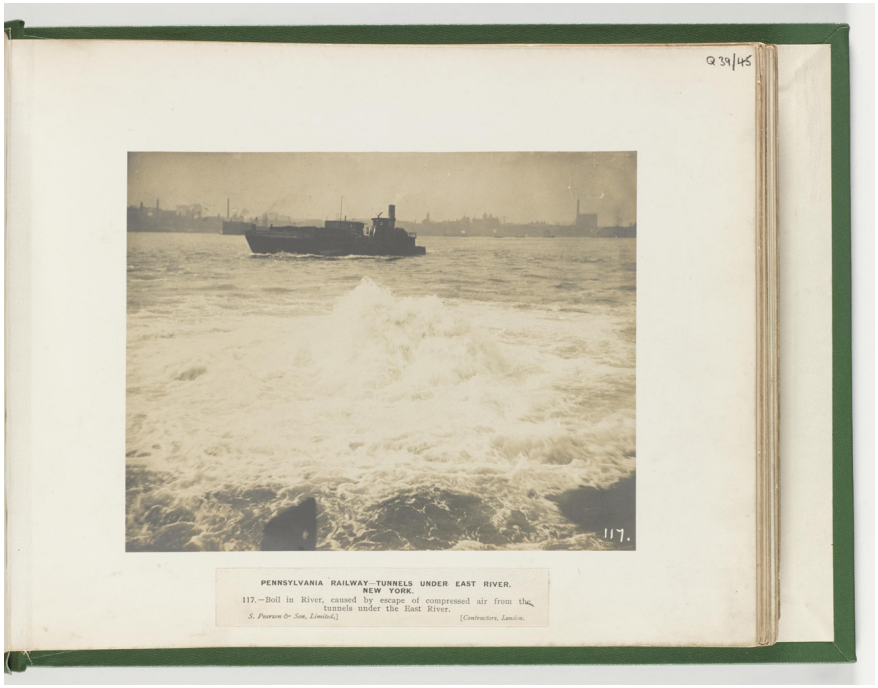
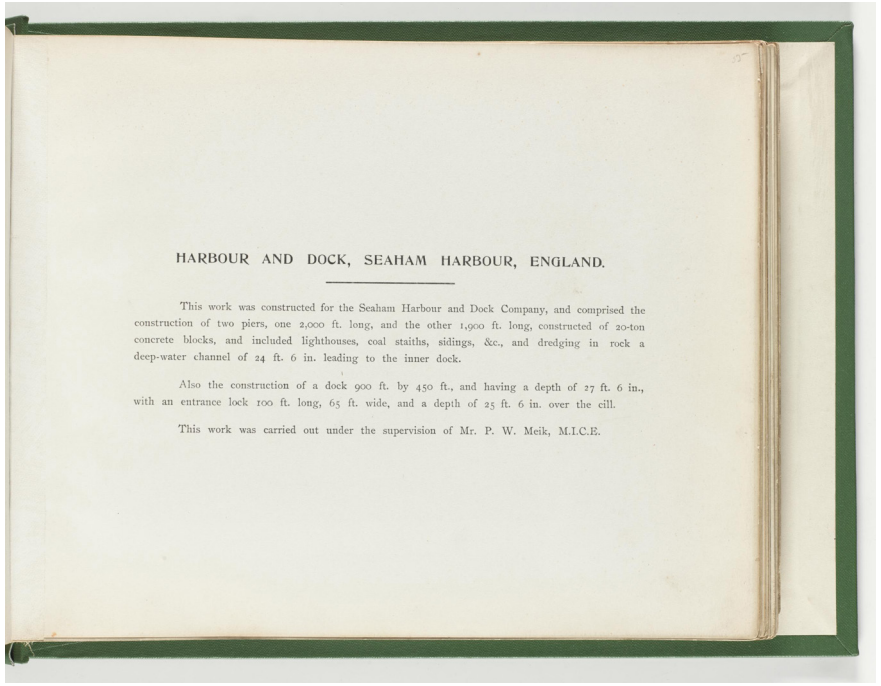


Figure 4.87: Unknown author, “Boil in river, caused by escape of compressed air from the tunnels nels under the East river”



HARBOUR AND DOCK, SEAHAM HARBOUR, ENGLAND.

This work was constructed for the Seaham Harbour and Dock Company, and comprised the construction of two piers, one 2,000 ft. long, and the other 1,900 ft. long, constructed of 20-ton concrete blocks, and included lighthouses, coal staiths, sidings, &c., and dredging in rock a deep-water channel of 24 ft. 6 in. leading to the inner dock.

Also the construction of a dock 900 ft. by 450 ft., and having a depth of 27 ft. 6 in., with an entrance lock 100 ft. long, 65 ft. wide, and a depth of 25 ft. 6 in. over the cill.

This work was carried out under the supervision of Mr. P. W. Meik, M.I.C.E.

Figure 4.88: Unknown author, “Harbour and dock, Seaham Harbour, England”

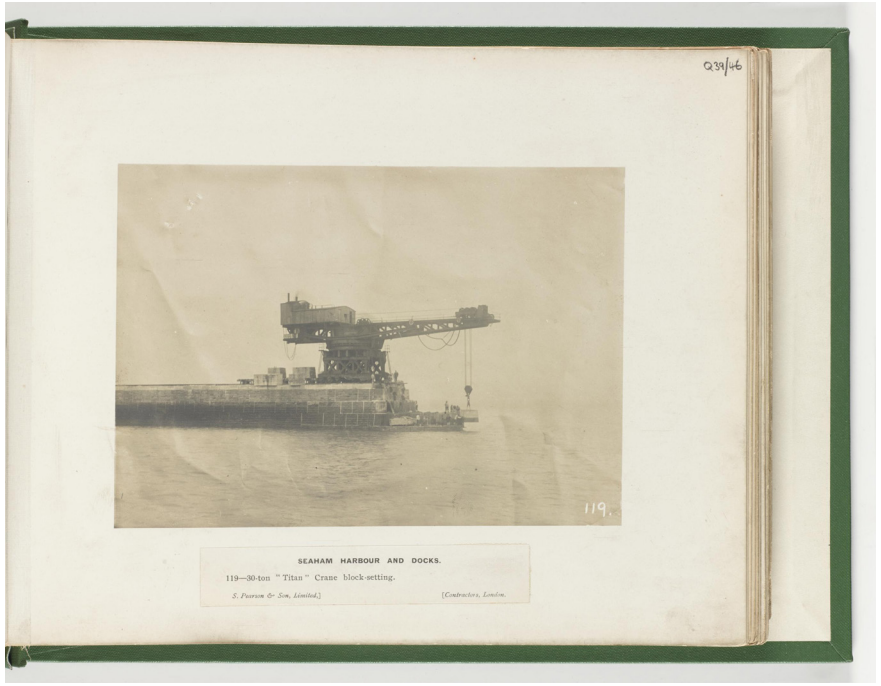


Figure 4.89: Unknown Unknown author,, “30-ton ‘Titan’ crane block setting”

Figure 4.90: Unknown photographer, “General view of dock excavation”

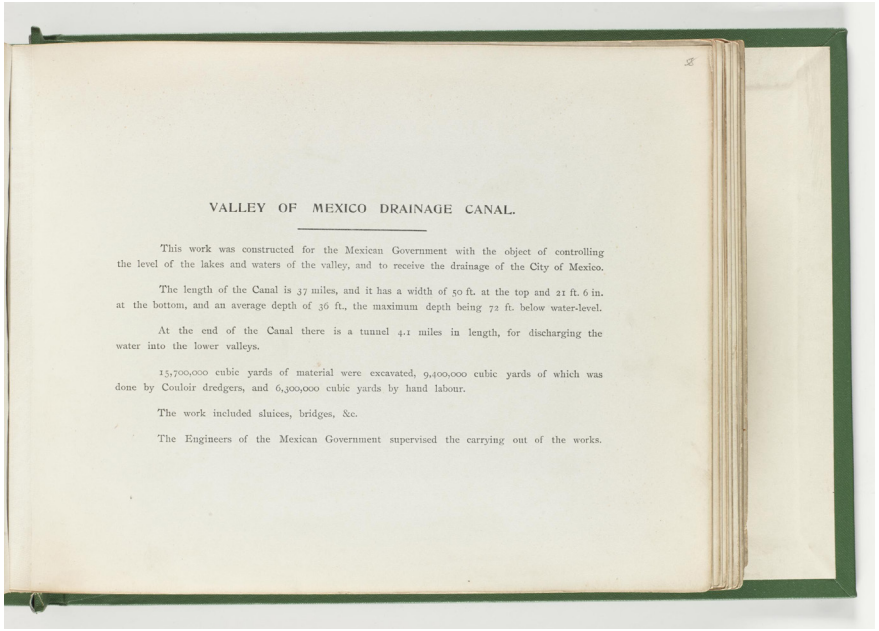


Figure 4.91: Unknown author, “Valley of Mexico drainage canal”

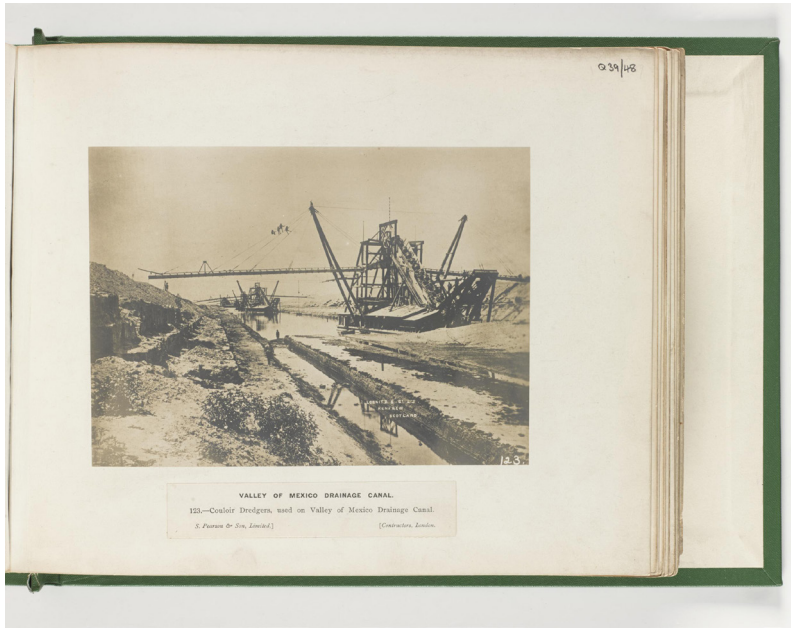


Figure 4.92: Unknown author, “Couloir dredgers, used on valley of Mexico drainage canal”

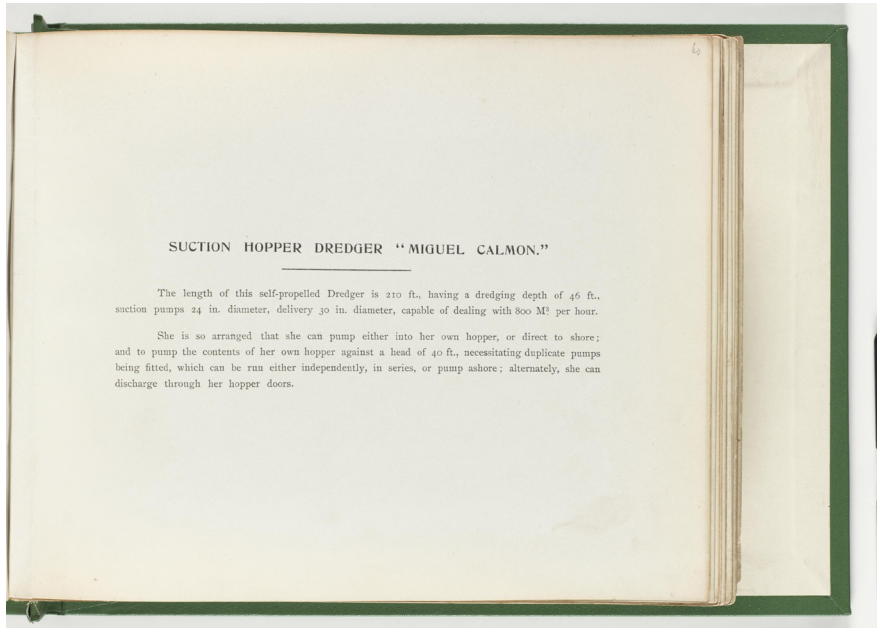


Figure 4.93: Unknown author, “Sand-pump (suction) hopper dredger ‘Miguel Calmon’, 800 m3 per hour capacity”

Figure 4.94: Unknown author, “Sand-pump (suction) hopper dredger ‘Miguel Calmon’, 800 m3 per hour capacity”

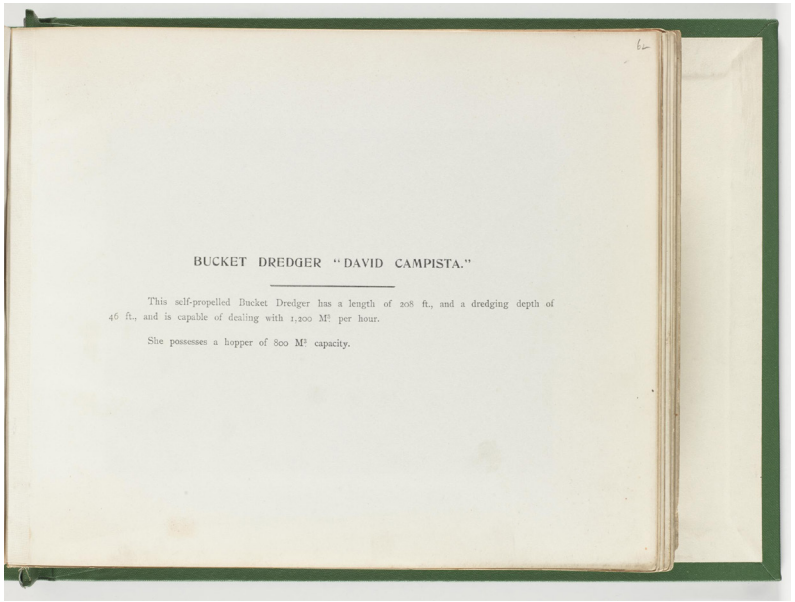


Figure 4.95: Unknown author, “Bucket dredger ‘David Campista’ 1,200 m3 per hour”

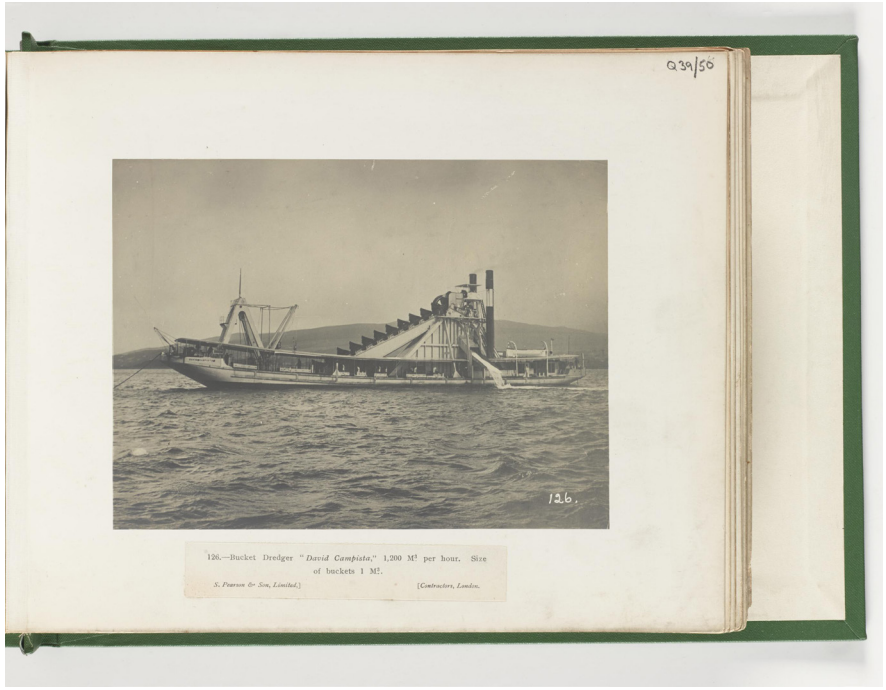


Figure 4.96: Unknown author, “Bucket dredger ‘David Campista’ 1,200 m3 per hour”

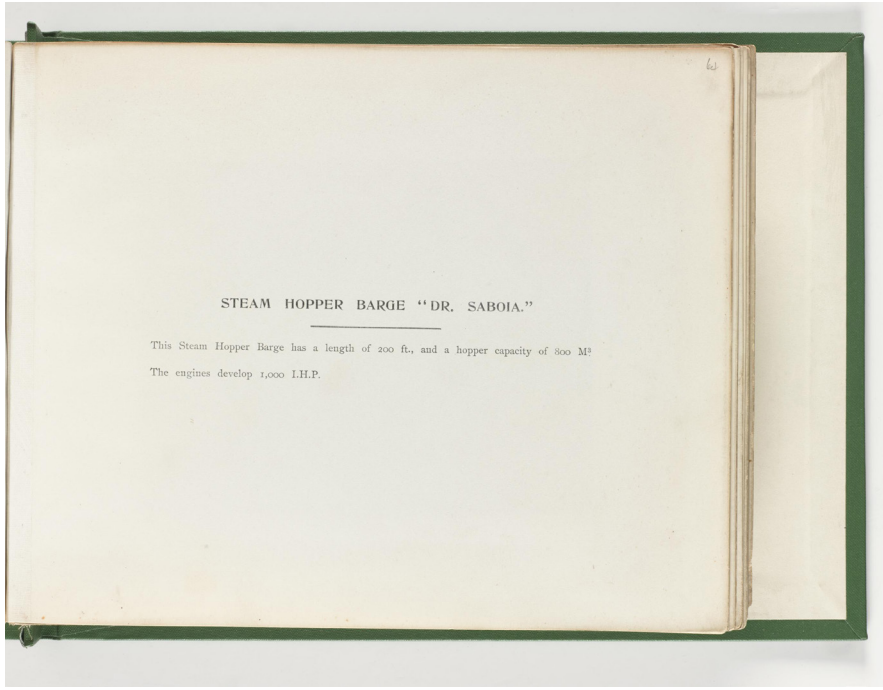


Figure 4.97: Unknown author, “Steam hopper (barge) ‘Doctor Saboia’”

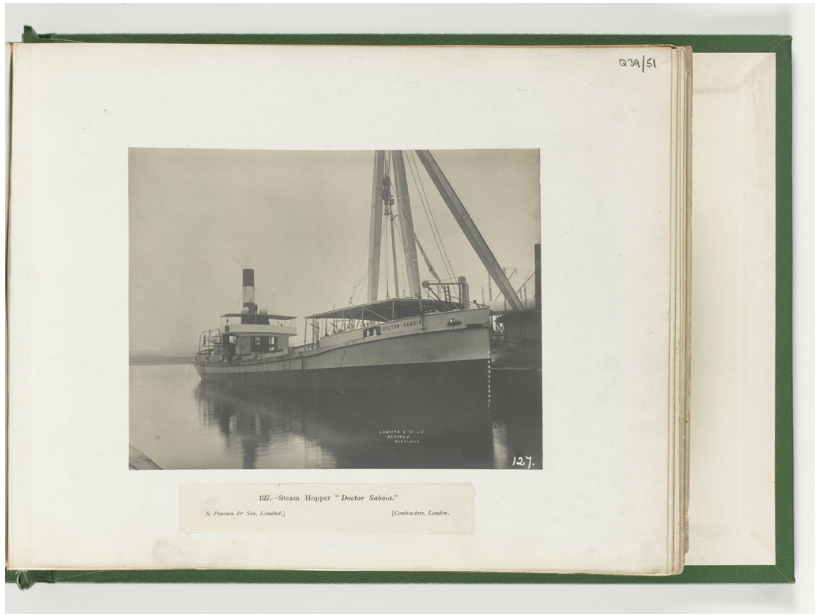
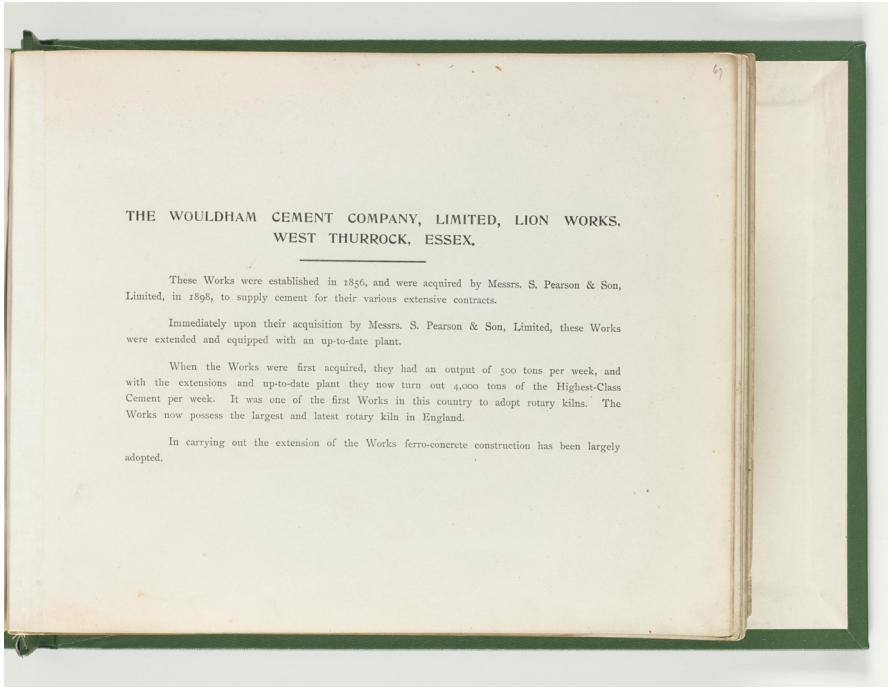


Figure 4.98: Unknown author, “Steam hopper (barge) ‘Doctor Saboia’”

Figure 4.99: Unknown author, “Dredger ‘Andre Reboucas’ and Hopper barge ‘Val de Caes’”



THE WOULDHAM CEMENT COMPANY, LIMITED, LION WORKS, WEST THURROCK, ESSEX.

These Works were established in 1856, and were acquired by Messrs. S. Pearson & Son, Limited, in 1898, to supply cement for their various extensive contracts.

Immediately upon their acquisition by Messrs. S. Pearson & Son, Limited, these Works were extended and equipped with an up-to-date plant.

When the Works were first acquired, they had an output of 500 tons per week, and with the extensions and up-to-date plant they now turn out 4,000 tons of the Highest-Class Cement per week. It was one of the first Works in this country to adopt rotary kilns. The Works now possess the largest and latest rotary kiln in England.

In carrying out the extension of the Works ferro-concrete construction has been largely adopted.

Figure 4.100: Unknown author, “The Wouldham cement company”

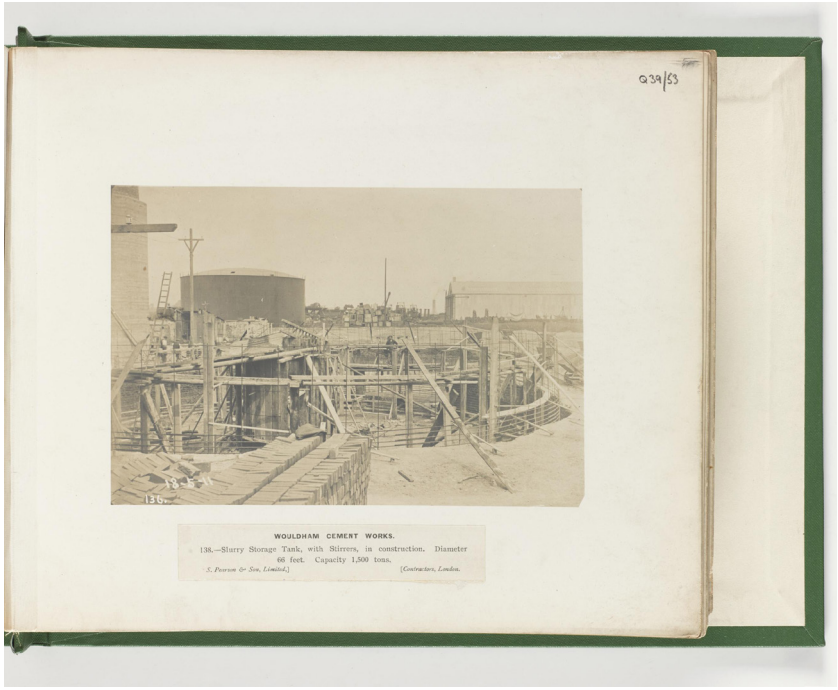


Image 4.101: Unknown author, “Slurry storage tank, with stirrers, in construction” 1911

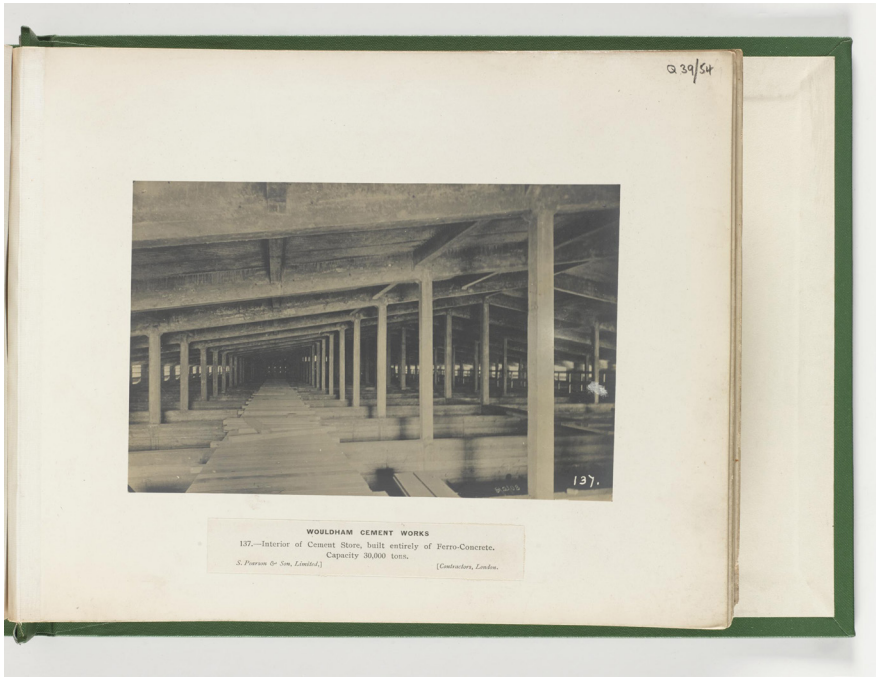


Figure 4.102: Unknown author, “Interior of cement store, built entirely of ferro-concrete. Capacity 30,000 tons” 1908

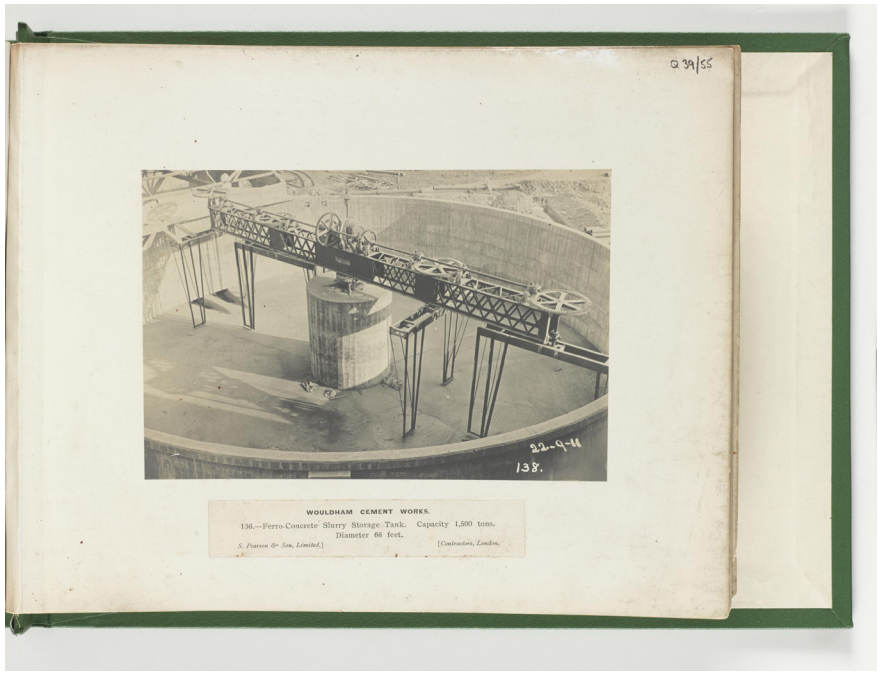


Figure 4.103: Unknown author, “Ferro-concrete slurry storage capacity 1,500 tons” 1911

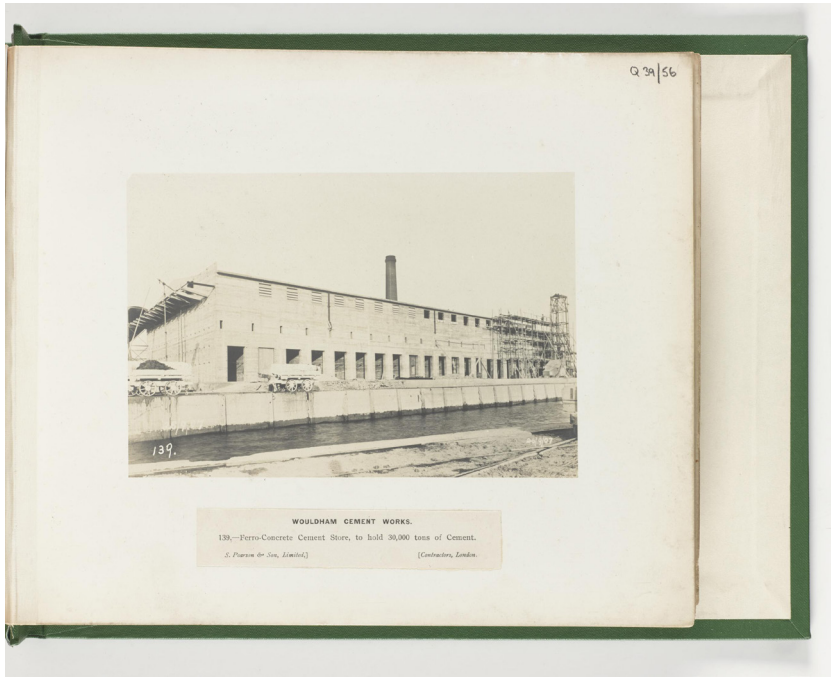


Figure 4.104: Unknown author, “Ferro-concrete store to hold 30,000 tons of cement” 1907

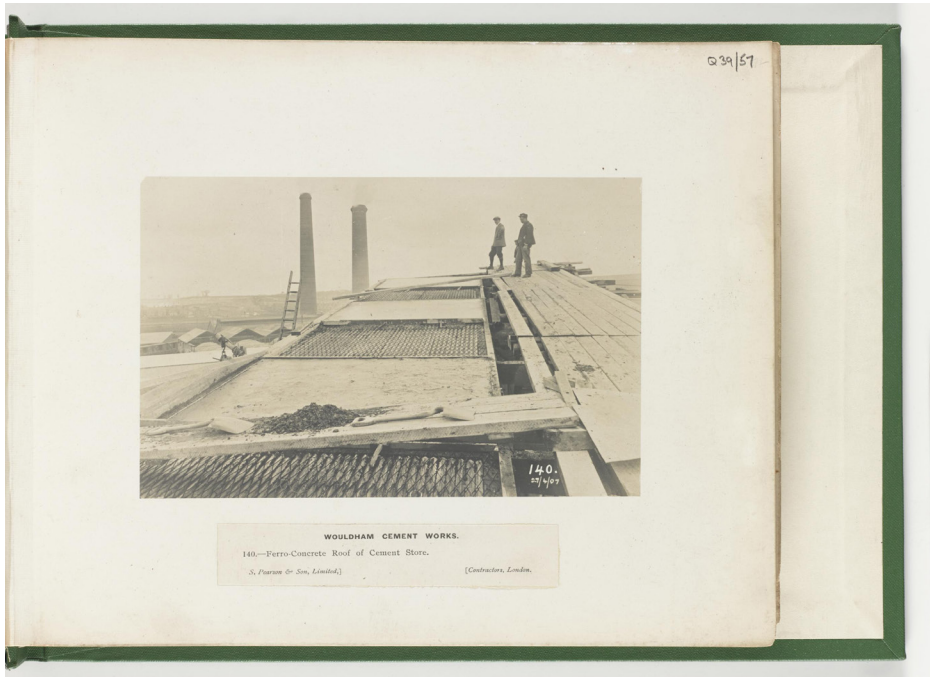


Figure 4.105: Unknown author, “Ferro-concrete roof of cement store” 1907

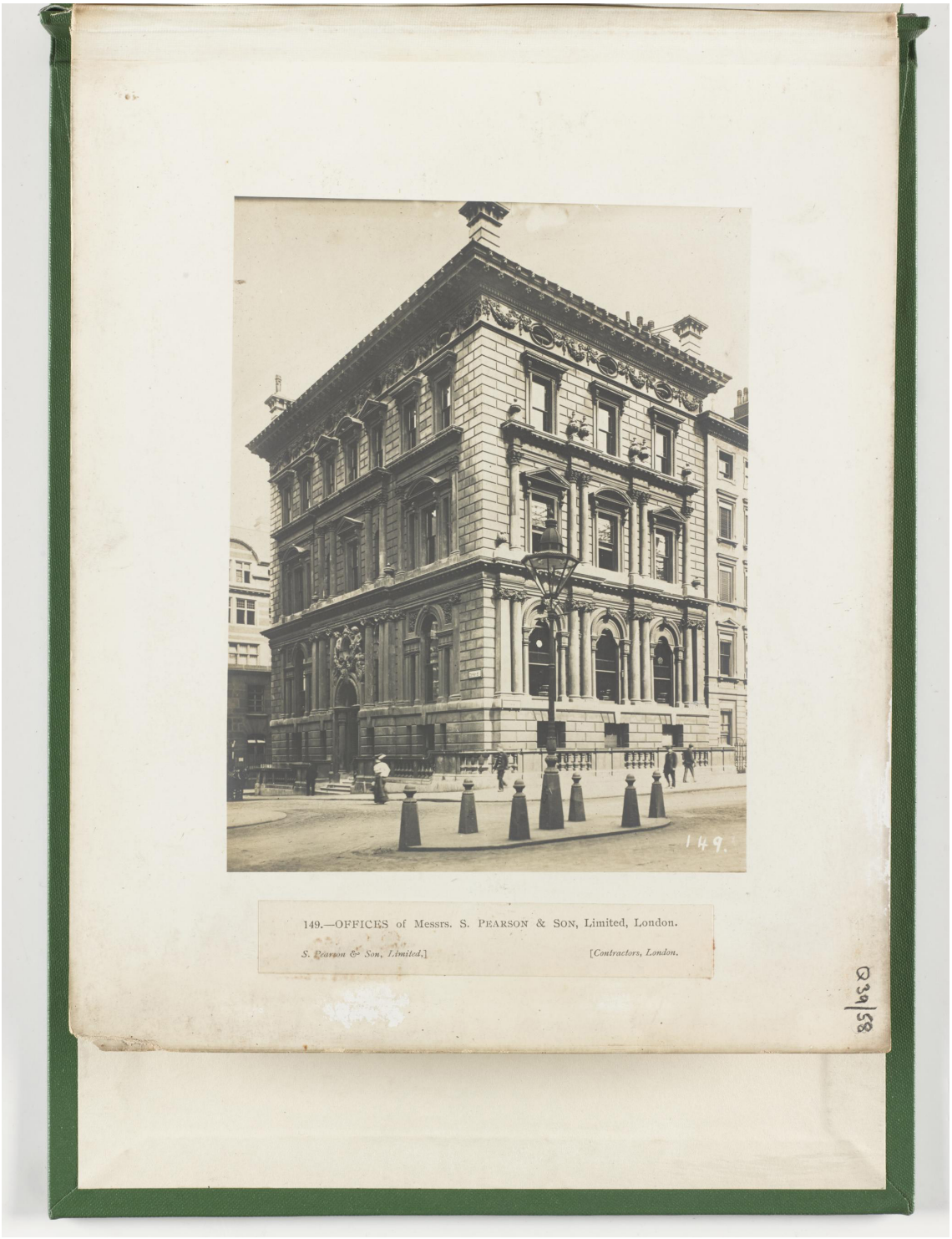


Figure 4.106: Unknown author, “Office of Messrs. S. Pearson & Son, Limited, London”